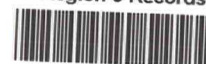


# REPORT

EPA Region 5 Records Ctr.



361508

## ADDITIONAL SOIL AND GROUNDWATER SAMPLING

### SAUGET AREA 2 SITES SAUGET, ILLINOIS

May 2007



URS Corporation  
1001 Highland Plaza Drive West, Suite 300  
St. Louis, MO 63110  
(314) 429-0100  
Project #

**R E P O R T**

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GROUNDWATER SAMPLING**

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**Project #**

## **Sauget Area 2 Sites Group**

May 9, 2007

Mr. Timothy Fischer  
U. S. Environmental Protection Agency, Region 5  
77W. Jackson Blvd. (SR-6J)  
Chicago, IL 60604-3590

Re: Sauget Area 2 - Sauget, Illinois

Dear Mr. Fischer:

Enclosed is the Data Validation Report for the Supplemental Investigation Phase 2 & 3.

Please call us with any comments or questions on this report.

Sincerely,

*Gary Uphoff.*  
*By SD Smith*

Gary D. Uphoff  
Co-Project Coordinator



Steven D. Smith  
Co-Project Coordinator

cc: Sandy Bron - 2 Hard Copies & 2 CDs  
Clair Morris - 1 Hard Copy & CD  
SA2SG File





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## **Glossary of Acronyms and Abbreviations**

# **GLOSSARY OF ACRONYMS AND ABBREVIATIONS**

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CCC	Calibration Check Compound
CV	Calibration Verification
CLP	Contract Laboratory Program
CM	Corrective Measures
COC	Chain of Custody
DI	Deionized
DO	Dissolved Oxygen
DQO	Data Quality Objective
eV	Electron volt
FSP	Field Sampling Plan
GC/MS	Gas Chromatography/Mass Spectrometry
HCl	Hydrochloric Acid
ICP-AES	Inductively Coupled Plasma- Atomic Emission Spectrometry
ICS	Interference Check Sample
ICV	Initial Calibration Verification
ID	Identification
IDL	Instrument Detection Limit
IDW	Investigative-Derived Waste
IEPA	Illinois Environmental Protection Agency
IS	Internal Standard
J	Estimated Value
LCS	Laboratory Control Sample
MCAWW	Methods for Chemical Analysis of Waters and Wastes
MDL	Method Detection Limit
MNA	Monitored Natural Attenuation
MS/MSD	Matrix Spike/Matrix Spike Duplicate
ND	Nondetect
%D	Percent Difference
%R	Percent Recovery
%RSD	Percent Relative Standard Deviation
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability and Sensitivity
PCB	Polychlorinated Biphenyl
PCDD	Polychlorinated Dibenzodioxins
PCDF	Polychlorinated Dibenzofurans

## **GLOSSARY OF ACRONYMS AND ABBREVIATIONS**

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pH	Hydrogen ion exponent
PID	Photo ionization Detector
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
r	Correlation coefficient
R	Rejected value
RF	Response Factor
RL	Reporting Limit
RPD	Relative Percent Difference
RSK	Robert S. Kerr Laboratory
SA2SG	Sauget Area 2 Sites Group
SDG	Sample Delivery Group
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
STL	Severn-Trent Laboratories
TAL	Target Analyte List
U	Nondetect Value (under the MDL)
UJ	Estimated Nondetect (under the MDL)
URS	URS Corporation
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOA	Volatile Organic Analysis
VOCs	Volatile Organic Compound
WP	Work Plan



The purpose of this investigation was to collect additional soil and groundwater samples as part of a Supplemental Investigation conducted at the Sauget Area 2 Sites in Sauget, Illinois. This Validation Report discusses the laboratory analyses of soil and groundwater samples performed by Severn Trent Laboratories located in Savannah, Georgia and Sacramento, California. The field investigation was conducted by URS Corporation (URS). Field quality control activities such as equipment decontamination, field equipment calibration, sample verification that could have affected the data are also addressed. The data usability is assessed in this Report in support of additional data characterization for the site.

## **1.1 PROJECT DESCRIPTION**

The sampling performed was to fill gaps in the data characterization at the Sauget Area 2 Sites. The scope of work was developed after several working meetings were conducted between the Sauget Area 2 Sites Group's (SA2SG) and the Agency. The rationale for each specific sampling activity, which included the type, number, and location of samples to be collected, was agreed upon by SA2SG, United States Environmental Protection Agency (USEPA), USEPA's oversight contractor CH2M Hill and Illinois Environmental Protection Agency (IEPA). Surface and subsurface soil samples were collected from soil borings associated with both the data gap and NAPL investigations. Groundwater samples were collected from monitoring wells. The sampling was completed using Standard Operating Procedures (SOPs), which are included in the Supplemental Investigation Phase 2 and 3 Work Plan (Work Plan). The samples collected as part of this investigation are listed in Table 1-1 of this report.

## **1.2 OVERALL PROJECT OBJECTIVES**

The objective of the sampling was to fill the data gaps identified by the Agency. The scope of work was agreed between SA2SG and the Agency. All historical documents, aerial photographs, and analytical results relevant to the various projects in Sauget were reviewed before the scope of work was finalized.





## **2.1 QUALITY CONTROL ACTIVITIES**

Document review and decontamination activities took place prior to and concurrent with the field program implementation. Communication with the project manager clarified and confirmed the proposed sampling activities when conflicting information was encountered in the work plan document. The review and continuous communication assured that the samples collected during this program would meet prescribed project guidelines and satisfy the project data quality objectives (DQOs). Documentation of sampling activities and sample shipment chain-of-custody (COC) records were designed to confirm that all proposed investigation activities were completed as planned. Copies of the COC forms are presented in Appendix B of this report.

### **2.1.1 Document Review**

Prior to the startup of field activities, the Work Plan, the Quality Assurance Project Plan (QAPP), and the Health and Safety Plan were provided to the members of the field sampling teams for their review. This familiarized them with the site being investigated, the objectives of the investigation, and the SOPs under which the field activities were to be completed. Field personnel were briefed on the work to be completed prior to project startup. Coordination of the field sampling activities was maintained through open communication among project management personnel, the field sampling teams, and the analytical laboratories.

### **2.1.2 Equipment Decontamination**

The equipment decontamination was performed in accordance with SOP No. 4 (Decontamination) of the Work Plan. Mobile decontamination supplies were provided to ensure that re-usable equipment was decontaminated between sampling locations. An Alconox<sup>®</sup> and potable water mixture solution was used on all reusable equipment after each sample was collected. A distilled water rinse was applied after the Alconox<sup>®</sup> mixture. Disposable nitrile gloves were worn during decontamination activities, and were changed between locations. Reusable equipment includes but is not limited to the stainless steel trowels, spoons, well probes, and pumps. All new tubing was used at each well location. Decontamination activities during the field investigation were overseen and verified at various times by the URS Field Supervisor.

Used decontamination solutions and solid waste generated during the sampling activities were stored on-site in double-walled tanks and roll-off boxes for later disposal.

**2.1.3 Sample Verification**

During field activities, the field sampling team reviewed the QAPP to verify the sample collection requirements for each sampling location. The review included the verification of target analytes, sample container requirements and the quality assurance/quality control (QA/QC) sampling requirements. Information concerning the number and type of samples collected at each location was documented as identified in Section 2.2.2. Any questions or inconsistencies that arose during the field activities were directed to the URS Project Manager for resolution.

**2.1.4 Field Equipment Calibration**

All field instrumentation was calibrated prior to and during continued use. The calibration and maintenance history of project-specific field instrumentation is an important aspect of the project's overall QA/QC program. Trained personnel followed the manufacturers' recommended instructions and SOP No.3 (Calibration and Maintenance of Field Instruments) to complete all initial and continuing calibration procedures. This ensured the equipment was functioning within the tolerances established by the manufacturer and the USEPA method-specific requirements, where applicable. The calibration and maintenance was the responsibility of the field supervisor and documented in Equipment Calibration Log Forms. Entries in the Form included:

- Date and time of calibration
- Type of equipment
- Name of person completing calibration
- Reference standard used for calibration
- Initial reading.

Air monitors equipped with a 10.2 electron volt (eV) photo ionization detector (PID) lamp were utilized to perform air monitoring during activities. The air monitors were calibrated daily in accordance with manufacturer's instructions. Details of the air monitoring procedures and other health and safety procedures are described in the Health and Safety Plan.

Temperature, pH, conductivity, dissolved oxygen (DO), oxygen reducing potential (ORP), and turbidity were measured in the field at all the groundwater locations sampled. Measurements were made using a Troll 9000 water quality meter following manufacturer procedures. Prior to

the daily field activities, the water quality meter was calibrated and verified to be within the instrument manufacturer's specified criteria.

## **2.2 SAMPLE COLLECTION ACTIVITIES**

Samples were collected for chemical analyses during the investigation in accordance with the field sampling procedures summarized in the Work Plan. The samples were collected at the Sauget Area 2 Sites from May to July 2006. Table 1-1 of this Quality Summary Control Report (QSCR) summarizes the samples collected and includes sample identification, sampling date and time, sample matrix, and parameters analyzed for each sample.

Samples were submitted to Severn-Trent Laboratories (STL) in Savannah, Georgia for all parameters with the exception of the Dioxin sample. This sample was sent to STL in Sacramento, California.

### **2.2.1 Sample Containers, Handling, and Labeling**

The samples were placed in certified pre-cleaned sample containers containing preservatives, if required, sealed, and affixed with a sample label in accordance with the Sample Handling Procedures listed in SOP No. 25 (Sample Containers, Preservation and Holding Times). The samples were then placed immediately on ice. Sample labels included the sample identification number, the target analytes, the type of QC for the sample being collected, sampler's initials, and the sample collection date and time as specified in Section 5 of the QAPP. Sample labels were covered with clear tape to prevent the tearing or loss of the sample identification label, should it become wet or abraded, in the sample cooler during transit.

Sample information, such as identification numbers, targeted analytes, sampling times, and QA/QC sample types, was documented on COC forms for shipment to the analytical laboratory. Completed COC forms were signed and one copy of the completed COC form was removed and retained for the field and office files. URS St. Louis packed the coolers after the daily sampling collection activities were completed and shipped them via overnight delivery service to STL Savannah or Sacramento.

The analytical laboratories and URS were in contact regularly regarding the number and type of samples shipped. These conversations also allowed for the expedient resolution of any questions or discrepancies arising from previous sample shipments.

**2.2.2 Documentation of Field Activities**

Field logbooks and sample collection field sheets were completed for the documentation of the field activities. All field activities and samples collected were documented in the field logbooks. Sample collection was also documented on the COCs. In addition, the groundwater samples were documented on sample collection field sheets.

**2.2.3 Sample Designation**

Samples collected were labeled with unique sample identification as summarized in Section 4 of the QAPP. There was no transcription errors associated with the samples collected.

**2.2.4 Field QA/QC Samples**

QA/QC activities in the field included the collection of field blank/trip blank, duplicate sample pairs, and matrix spike/matrix spike duplicate (MS/MSD) samples. The following sections detail the field QA/QC samples collected.

**2.2.4.1 Trip Blank Samples**

Trip blanks accompanied samples collected for volatile organic analyses and consisted of VOA vials filled with organic-free water and chemical preservative hydrochloric acid (HCl) at the laboratory. Trip blank samples were shipped by the laboratory to the site with the empty sample containers and sent back to the laboratory with environmental samples. The VOA vials were opened only in the laboratory at the time of analysis. At least one trip blank sample accompanied each cooler, which contained volatile organic compounds (VOC) samples, used to ship samples to the laboratory. Trip blank information was used to estimate error associated with sample shipment, sample containers and laboratory analysis.

**2.2.4.2 Field Duplicate Samples**

Field duplicate samples were collected and submitted for analysis at an approximate ten percent frequency. Field duplicates were collected following the same procedures as the original samples. The field duplicates were submitted to STL as routine analytical samples.

Field duplicate results provided estimates for overall precision of sample collection, field sample preparation, and laboratory analysis. The duplicate sample data was used to assess the usability of the sample data. Field duplicates are identified in Table 2-1. The results of the field duplicate samples are discussed in the data reviews summarized in Appendix C of this Validation Report.

**2.2.4.3 Matrix Spike/Matrix Spike Duplicate Samples**

The field supervisor selected which samples were used for MS/MSD analysis. Samples collected for MS/MSD analysis had 2 times the required volume submitted to the laboratory for the additional analyses. MS/MSD data was evaluated to assess accuracy and precision of the methods utilized for the analyses of samples associated with the field activities. Results of the MS/MSD samples are discussed in the data reviews and data validations summarized in Appendix C of this report.

**2.2.4.4 Field Blanks**

Field blanks were collected and submitted to the laboratory with the investigative samples and analyzed for the same parameters as the investigative samples. Field blanks consisted of distilled or de-ionized (DI) water which was poured over cleaned sampling equipment in between sample collections. Field blanks were collected unless dedicated sampling equipment was used to collect samples. Field blanks were analyzed to check for procedural contamination at the site which may have caused sample contamination.



**3.1 SAMPLE DOCUMENTATION**

Documentation of sample tracking is an important aspect of environmental investigations and is designed to maintain the sample integrity subsequent to sample collection.

The URS field crews were responsible for completing COC forms which described the sample identification, time of collection, sample matrix, analyses requested, preservatives (if required), and any additional comments. The COCs were placed in the coolers shipped to the laboratory. Upon receipt of the coolers, the laboratory reviewed each cooler and accompanying COCs. Copies of the completed COCs are presented in Appendix B.

The laboratory sent URS sample confirmations via e-mail. Some minor discrepancies were noted during the sample receipt. These issues were addressed immediately with the field manager and were corrected prior to the submittal of the data package. URS was contacted regarding an anomaly for samples received July 6, 2006. Sample vials were received by the laboratory for sample SA2-MW-4-D requesting pesticide and PCB analysis, this analysis was not requested on the COC for this sample. URS confirmed that sample SA2-MW-4-D was also to be analyzed for pesticides and PCBs. A trip blank with sample ID TB-15 was received by the laboratory on July 12, 2006 and was not listed on the COC. URS was contacted and confirmed the sample and VOC analysis was requested. No additional problems or discrepancies were noted. All issues listed above were resolved prior to analysis and did not impact project DQOs.



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**4.1 LABORATORY PROCEDURES**

The samples collected during the Supplemental Investigation were analyzed following USEPA methods as summarized below. The associated QC review and data validation summaries are provided in Appendix C, respectively. The laboratory provided, in various batches, documentation for the methods listed below, including sample preparation, sample tracking, and documentation controls.

The data reported by the laboratory were reviewed and qualified accordingly. The qualifiers assigned are listed in Table 4-1.

**4.1.1 Volatile Organics**

VOC analysis were analyzed by (USEPA) Method 8260B (SW-846) and prepared by USEPA Methods 5030B (aqueous) and 5035 (soil). Method 8260B utilizes gas chromatography/mass spectrometry (GC/MS) for separation and detection, respectively.

**4.1.2 Semi-Volatile Organics**

USEPA Method 8270C (SW-846) is a GC/MS method that was used for determining extractable base/neutral and acid compounds. Samples were prepared by following USEPA Method 3520C (aqueous) and 3550B (soil) and analyzed using Method 8270C.

**4.1.3 Polychlorinated Biphenyls**

USEPA Method 680 is a GCMS method that was used for the determination of Polychlorinated biphenyls (PCBs). Samples were cleaned by USEPA Method 3640A. Samples were prepared by EPA 680-P-Liquid method.

**4.1.4 Organochlorine Pesticides**

USEPA Method 8081A (SW-846) uses Gas Chromatography. This method was used for the determination of Pesticides. The samples were prepared using USEPA Method 3550B (soil) and 3520C (aqueous).

**4.1.5 Herbicides**

USEPA Method 8151A uses Gas Chromatography. This method was used for the determination of Herbicides. The samples were prepared using USEPA Method 8151A (soil and aqueous).

**4.1.6 Metals**

USEPA Method 6010B by inductively coupled plasma-atomic emission spectrometry (ICP-AES) was used for the determination of metals. The samples were prepared using USEPA Methods 3050B (soil) and 3005A (aqueous). "Trace" ICP technology was used for all metals analysis except mercury. Samples were prepared and analyzed for mercury using Method 7470A (aqueous) and 7471A (soil).

**4.1.7 Nitrogen (Ammonia)**

Methods for Chemical Analysis of Water and Wastes (MCAWW) Method 350.1 were used for the colorimetric determination of ammonia. Samples were prepared using EPA Method 3-154.

**Dioxins/Furans**

USEPA Method 8290 was used for the determination of Dioxins. Samples were prepared as outlined in the respective method. Method 8290 utilizes high resolution GC and high resolution MS.

**4.1.8 Monitored Natural Attenuation Parameters**

Selected groundwater samples had monitored natural attenuation (MNA) parameters tested using the following methods:

- Nitrogen, Nitrate-Nitrite using Method 353.2
- Alkalinity and Carbon Dioxide using Method 310.1
- Sulfate using Method 375.4
- Chloride using Method 325.2
- Total Organic Carbon using Method 9060
- Dissolved Gases in Water using Robert S. Kerr (RSK) laboratory Method 175.

**4.2 LABORATORY QA/QC SAMPLES****4.2.1 Method or Preparation Blank**

The method or preparation blank for the analysis consisted of organic-free water. The blank was carried through each step of the analytical method, from extraction to analysis. The method and preparation blank data were used to evaluate potential contamination contributed to sample preparation and analysis during normal laboratory operations.

**4.2.2 Surrogate Spikes**

Surrogate spikes are compounds added to every blank, sample, matrix spike, matrix spike duplicate, and standard when specified in the analytical methodology. The results are utilized to evaluate the accuracy of analytical measurements on a sample-specific basis. Surrogates are generally brominated, fluorinated, or isotopically labeled compounds not expected to be present in environmental media. Results are expressed as percent recovery (%R) of the surrogate spike. Recoveries outside of criteria can indicate evidence of matrix interference or problems with internal standards.

**4.2.3 Laboratory Control Samples**

Laboratory control samples (LCS) are well-characterized, laboratory-generated samples and are used to monitor the laboratory's day-to-day performance of analytical methods. The organics LCS limits are based on  $\pm$  three sigma and are updated every six months. Inorganic LCS limits are based on a prescribed set of limits with each standard lot. LCSs are used to monitor the precision and accuracy of the analytical process independent of matrix effects. In some instances, the LCS is used to identify any background interference or contamination of the analytical system, which may lead to the reporting of elevated concentration levels or false positive results. The results of the LCS are compared to well-defined evaluation criteria to determine whether the laboratory system is "in control." Controlling laboratory operations with LCS, rather than surrogates or MS/MSD, offers the advantage of being able to differentiate low recoveries due to procedural errors from those due to matrix effects.

**4.2.4 Matrix Spike/Matrix Spike Duplicates**

MS/MSD samples are used to evaluate accuracy and precision using matrix as an indicator for organic and inorganic analyses. Organics MS/MSD limits are based on  $\pm$  three sigma and are updated every six months. Inorganic MS/MSD limits are based on a prescribed set of limits with each standard lot. The laboratory analyzes MS/MSD samples with each analytical batch. MS/MSD criteria are established from either historical laboratory limits or those values identified in USEPA SW-846 methodology.

**4.2.5 Internal Standards Performance**

Internal standards, which are compounds not found in environmental samples, are spiked into blanks, samples, MS/MSDs, and LCSs at the time of sample preparation. Internal standards for polychlorinated dibenzodioxin (PCDD) and polychlorinated dibenzofuran (PCDF) analyses are used to quantitate target compounds and to correct for variability of sample preparation, cleanup,

## **SECTION FOUR**

## **Analytical Procedures**

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and analysis with respect to individual sample matrices. Internal standards must meet retention time and performance criteria specified in the analytical method or the sample would have been reanalyzed.



The data review process, which involved a review of the laboratory summary data, was implemented to assess the quality of data resulting from the field sampling program with respect to the quality assurance objectives established for the project. In order to evaluate the appropriate usage of the data, in supporting decisions to be made, the data was evaluated with respect to data quality, major data uses, and the remedial decision to be made. Data that did not meet the criteria were qualified or discussed for the limitation on usability. In addition, approximately 10 percent of the data underwent a more comprehensive evaluation which included the review of raw data (i.e., chromatograms, run logs, etc.), recalculation of data, and sample tracking. For the purpose of this document, this extended review was termed full validation.

The following sections summarize the data review and data validation approach used for the Sauget A2 samples. In general, the review and validation followed guidance as presented in USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (USEPA 1999) and Inorganic Data Review (USEPA 2004), as applicable to SW-846 analytical methods and method-specific criteria. As indicated above, the data review involved reviewing QC summary forms, whereas the validation additionally involved the review of raw data. Table 3.1 of the Sauget A2 QAPP (URS 2004) summarizes the data review/validation criteria in tabular format. Professional judgment was used to determine appropriate actions and may not have necessarily followed the criteria outlined.

## **5.1 DATA REVIEW/VALIDATION ELEMENTS**

Analytical laboratory results were reviewed following guidance presented in USEPA CLP National Functional Guidelines for Organic Data Review (USEPA 1999) and USEPA CLP National Functional Guidelines for Inorganic Data Review (USEPA 2004). The data were reviewed/validated using the QC criteria specified in the Sauget A2 QAPP (URS 2004). These guidelines were used as applicable to SW-846 methods. Method-specific and established laboratory criteria were used for data assessment. Based on results of the data review/validation processes, sample data may have been qualified as **J** (estimated), **UJ** (estimated nondetects), **U** (nondetects), or **R** (rejected).

In accordance with these guidelines, professional judgment was used in certain areas to determine the need for data qualification. Professional judgment, as prescribed by the USEPA Functional Guidelines, involved a secondary evaluation of data with respect to qualifications. This took into account additional knowledge based on experience with laboratory practices,

analyte-specific factors such as chemical properties, and other current resolutions of technical issues addressed in the literature.

Although the data packages provided were not CLP deliverables, the CLP guidance was followed where applicable to SW-846 methodology. The QC elements reviewed in laboratory analytical data packages included the following:

- Completeness of the data package
- Laboratory case narrative and cooler receipt forms
- Compliance with required holding times and sample preservation
- Presence of analytes in method blanks and trip blanks
- Results of LCS
- Recoveries of surrogate spikes in samples
- Results of MS/MSD
- Recoveries of internal standards
- Field duplicate samples
- Serial dilution samples (metals only)
- Laboratory duplicate samples.

The data validation included all of the items identified above and additionally included the items below:

- Instrument performance check samples
- Run logs review
- Chromatograms review
- Initial calibration
- Calibration verifications (CV)
- Retention time windows
- Interference check samples (ICS) (ICP metals only)
- Analytical result verification.



When a result was above the method detection limit (MDL) and below the reporting limit, the laboratory flagged data **J** to indicate that the concentration reported is an estimated value. The data, including all post-analysis qualifiers, are presented in the data summary tables in Appendix A. The data review and validation results are presented in Appendix C.

The data review and validation procedures used to evaluate the Sauget A2 data are described in this section. The QC review details quality control issues associated with the analysis of the samples, describes if the data required qualification, and describes the use of professional judgment.

#### **5.1.1 Completeness of Data Package**

Data packages were reviewed to make certain that they contained the data contractually required in the deliverable. This included checking the data package for the results of each analyte requested on each field sample submitted in the analytical batch, along with the requested QC documentation for the respective methods.

#### **5.1.2 Sample Preservation and Holding Times**

Sample holding times were calculated by subtracting the date of sampling, as determined from the COC forms, from the date of sample extraction/analysis. If the sample analysis was completed outside of the required holding times, data was qualified as estimated **J** (detects) or **UJ** (nondetects), or rejected **R**, depending on the severity of the exceeded holding time. The validation additionally included reviewing run logs and chromatograms to ensure the dates presented on the summary forms were accurate.

#### **5.1.3 Blanks**

Guidance provided in the USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review was used for the evaluation of method blanks, preparation blanks, calibration blanks and trip blanks. If analytes were detected in a blank sample, but not in samples associated with the blank sample, then data was not qualified. If analytes were reported in a blank and in associated samples, the following actions were taken:

- Positive sample results were reported without qualification when the concentration of the analyte in the sample exceeded 10 times (10x) the amount in a blank for common laboratory contaminants (methylene chloride, acetone, 2-butanone, bis(2-ethylhexyl) phthalate, di-n-butyl phthalate), or exceeded 5 times (5x) the amount in a blank for other compounds. Note: The 10x rule was only applied to method blank samples.

- When the sample results were greater than the reporting limit (RL), but less than the required multiple (5x or 10x) of the method blank result, sample results were qualified as nondetects **U**, and the RL was raised to the sample concentration.
- When the sample results were less than the RLs and less than the required multiple of the method blank result, sample results were qualified as nondetects **U** at the RL.
- If any analyte was reported in a blank sample and was reported in associated samples, the data was closely reviewed and qualified as necessary based on professional judgment.

During the data validation, the chromatograms were reviewed to ensure all peaks were identified and explained. In addition, extraction and run logs were reviewed to ensure a method or preparation blank was analyzed with each batch.

#### **5.1.4 Surrogates**

Surrogates were used to assess accuracy for VOC, semi-volatile compounds (SVOCs), PCBs, pesticides, and herbicides analyses on a sample specific basis. Criteria for recovery of surrogate compounds spiked into samples are provided in Table 3.3 of the QAPP (URS 2004). For VOC, PCB, pesticide, and herbicide analyses, if any surrogate was out of specification due to recoveries greater than the upper evaluation limit, indicating a high bias, positive results for that sample were qualified as estimated **J**, and nondetects data were not qualified. If recoveries were below the lower evaluation limit, indicating a low bias, but greater than 10 percent, positive results for that sample were qualified as estimated **J**, and nondetects results were qualified as estimated **UJ**. For any surrogate recovery below 10 percent, positive results for that sample were qualified as estimated **J**, and nondetects results were qualified as rejected **R**. For SVOC analyses, the same approach was used except data were only qualified if two or more surrogate recoveries per fraction (acid, base/neutral) were outside criteria or any one surrogate compound recovery less than ten percent.

The validation additionally included recalculating the surrogate values from the raw data and reviewing the chromatograms to ensure the surrogate compounds were within the established retention time windows.

#### **5.1.5 Laboratory Control Samples**

LCS is well characterized, laboratory-generated samples used to monitor the laboratory's day-to-day performance for inorganic and organic analyses, and to assess the accuracy and precision of the analytical process independent of matrix effects. Evaluation criteria for LCS are provided in

Appendix A of the QAPP (URS 2004). Sample results associated with a LCS recovery below the evaluation limit were qualified as estimated **J** (detects) or **UJ** (nondetects) based on a potential low bias. If LCS recoveries were less than half the lower evaluation limit, sample results reported as nondetects were qualified rejected **R**. Detected sample results associated with a LCS recovery above the evaluation limit were qualified as estimated **J** based on a potential high bias. Data reported as nondetects were not qualified based on a LCS with potential high bias.

The validation additionally included reviewing extraction and run logs to ensure a LCS was analyzed with each batch. Approximately 10 percent of the LCS recoveries were recalculated using the raw data. In addition, chromatograms were reviewed to ensure the LCS compounds were within the retention time windows.

#### **5.1.6 Matrix Spike/Matrix Spike Duplicate Samples**

MS/MSD samples were analyzed for VOC, SVOC, pesticide, herbicide, metals, and wet chemistry parameter analyses. Evaluation criteria for accuracy (%R) and precision (Relative Percent Difference [RPD]) of the MS/MSD samples are provided in appendix of the QAPP (URS 2004). Per USEPA CLP National Functional Guidelines for Organic Data Review (USEPA 1999), no action was taken on organic MS/MSD data alone. MS/MSD data for organic methods were reviewed in conjunction with other QC parameters to determine if qualification was required. Samples analyzed for metals and wet chemistry parameters were qualified following USEPA CLP National Functional Guidelines for Inorganic Data Review (USEPA 2004).

In general, results for the sample on which the MS/MSD was prepared were qualified using the above guidelines. However using informed professional judgment, in conjunction with a review of the other QC criteria, the data reviewer may have determined the need for qualification of other sample data for the analytical batch from the site.

The validation additionally included reviewing extraction and run logs to ensure a MS/MSD was analyzed with each batch. Approximately 10 percent of the MS/MSD recoveries were recalculated using the raw data. Chromatograms from the organic analyses were also reviewed to ensure the MS/MSD compounds were within the retention time windows.

#### **5.1.7 Field Duplicate Samples**

Field duplicate samples were collected at a frequency of approximately 10 percent, as required by the Saugat A2 QAPP (URS 2004). RPDs were calculated for each field duplicate pair.

Precision evaluation criteria of 50 percent RPD for aqueous samples and criteria of 100 percent RPD for soil samples were considered if the analyte concentrations were greater than 5x the RL for both samples. For analytical results less than 5x the RL, for either or both samples, RPD evaluation criteria of  $\pm 2x$  the RL were utilized. Duplicate results were evaluated on a case-by-case basis to determine if qualification of data was necessary. Where it was determined that qualification of field duplicate samples was required, associated data were qualified **J** (detects) or **UJ** (nondetects).

#### **5.1.8 ICP Serial Dilution (Metals Data Review Only)**

The serial dilution of samples quantified by ICP determines whether or not significant physical or chemical interference's exist due to sample matrix. The ICP serial dilution analysis is measured on one sample from each analytical batch or sample delivery group (SDG). A serial dilution of a sample with sufficiently high analyte concentrations (i.e. greater than a factor of 50 above the instrument detection limit (IDL)) must agree within a 10 percent difference with the original analysis after correction for the dilution. If the 10 percent difference criteria are not met for analytes of sufficient concentration, then the associated data were qualified as estimated (**J**).

The following identifies additional parameters involved in the data validation that are not included in the data review.

#### **5.1.9 Instrument Performance Check (Data Validation Only)**

The laboratory was required to analyze an instrument performance check sample every 12 hours of sample analysis. The instrument performance check sample summaries were compared to the method criteria. In addition, approximately 20 percent of the values were recalculated from the raw data. The laboratory was required to meet the method criteria prior to analyzing samples. If the laboratory did not meet the tuning criteria, the associated samples were qualified as **R**.

#### **5.1.10 Preparation and Run Log Review (Data Validation Only)**

Review of the preparation and run logs involved reviewing the logs to determine that samples were extracted and analyzed as presented on the sample summary forms. The preparation and sample run logs were reviewed to determine that the correct sample volume was prepared, the appropriate QC samples (e.g., LCS, MS...) were analyzed as part of the analytical batch, and the samples were analyzed in the method-required order.

**5.1.11 Chromatogram Review (Data Validation Only)**

This involved a review of each chromatogram to determine that peaks were within the acceptable retention time windows of the associated standard. The review also included comparing the analysis times presented on the instrument run logs to those presented on the sample chromatograms. In addition, the review identified all peaks present on the chromatogram as either: target analytes, internal standards, surrogates, or tentatively identified compounds.

**5.1.12 Initial Calibration (Data Validation Only)**

Each method required establishing an initial calibration curve. The data validation involved reviewing the percent relative standard deviations (%RSDs), the response factors (RFs) or the correlation coefficient  $R$  if linear regression was employed. If %RSDs, RFs, or correlation coefficient  $R$  were not met for an analyte, the associated data was qualified as **J**, **UJ**, or **R**, depending on the severity of the outlying data point. One analyte per internal standard was recalculated using the raw data.

**5.1.13 Calibration Verification (Data Validation Only)**

Each method required the analysis of CV samples to ensure the initial calibration was still valid. The data validation involved reviewing the %D of the RFs between the CV and the associated calibration curve. If the RF or %D criteria were not met for an analyte, the associated data was qualified as **J**, **UJ**, or **R**, depending on the severity of the outlying data. One analyte per internal standard, or 10 percent of the data presented on the continuing calibration summary forms, were recalculated using the raw data.

**5.1.14 ICP Interference Check Sample (Metals Validation Only)**

An ICP ICS verifies the laboratory's interelement and background correction factors. The ICS consists of two solutions, A and AB. Solution A consists of the interferences and solution AB consists of the target analytes mixed with the interferences. The ICS analysis consists of analyzing both solutions consecutively, starting with solution A for all wavelengths used for each analyte reported by ICP. The ICS is run at the beginning and end of each analytical batch, or a minimum of twice per 8-hour shift. The results of the ICS analysis of solution AB must fall within the control limits of  $\pm 20\%$  of the true value for the analytes included in the solution. For samples where the ICS analyte recoveries exceed the control limits, data were qualified as **J**, **UJ**, or **R**, depending on the severity of the outlying data. Additionally, one hundred percent of the analytes in the ICS were recalculated using the raw data.

**5.2 MEASUREMENT OF QUALITY ASSURANCE OBJECTIVES**

The measurement of quality assurance was determined by the assessment of precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). The PARCCS definitions are included below and the PARCCS assessments are included in Section 8.

**5.2.1 Precision**

Precision is the measure of variability between individual sample measurements under prescribed conditions. Replicate measurements of known standards and the analysis of duplicate environmental samples assess precision. Evaluating the RPDs obtained from results of MSD, laboratory duplicate, and field duplicate samples assessed precision. The precision of the data is discussed in Section 8.

**5.2.2 Accuracy**

Accuracy is the degree of agreement between the measurement of a known sample and an accepted reference or true value. Evaluating %Rs for LCS, MS samples, and surrogates assessed accuracy. The accuracy of the data is discussed in Section 8.

**5.2.3 Completeness**

Following the QC review and validation of the data packages for the site, the data were assessed with respect to the fulfillment of QA objectives and usability. The completeness for laboratory analytical data for the site was calculated by the ratio of acceptable (including estimated data) analyses requested on the samples submitted for analysis, to the total number of analytical results requested.

$$\%Complete = \frac{\text{Number of Valid Analytical Results (including estimated J results)}}{\text{Total Number of Analytical Results Requested}}$$

The percent completeness, with respect to overall project objectives for the Sauget A2 project, was evaluated for the data required in making decisions on a case-by-case basis. In general, samples critical to the decision process required a 95 percent completeness goal.

**5.2.4 Representativeness**

Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a parameter primarily concerned with the proper design of the

sampling program (such as sampling location strategy) or sub-sampling of a given sample. Assessment of representativeness includes an evaluation of precision. Therefore, reviewing the precision of field duplicate samples collected from a site can assess representativeness of the analytical results, with respect to the medium sampled. Review criteria for field duplicate analyses are identified in Section 5.1.7.

### **5.2.5 Comparability**

Comparability expresses qualitatively the confidence with which one data set can be compared to another. Data are comparable when collection techniques, measurement procedures, methods, and reporting are equivalent for all samples within the sample set. Section 8 contains a qualitative assessment of data comparability.

### **5.2.6 Sensitivity**

Sensitivity broadly describes the RL established to meet the project-specific DQOs. The sample RL is the lowest concentration of an analyte present in a sample that can be quantified with a specified level of confidence. The RLs are a function of the sample characteristics, MDLs, and laboratory performance.

MDLs are determined by the laboratory and defined as the level at which the laboratory can reliably quantify the concentration of an analyte on multiple analyses. The RLs are greater than the MDLs because MDL studies are performed using laboratory-prepared samples (spiked DI water); whereas, environmental samples are naturally more variable. United States Army Corps of Engineers (USACE) requires that RLs are 3-5 times the MDL. MDLs and RLs are provided in Tables 1.4B through 1.4D of the Sauget A2 QAPP (URS 2004). For this project, data are reported below the RLs as estimated J. Factors that may result in elevated RLs are discussed below.

- High concentrations of target or non-target analytes may require that the sample extract be diluted to avoid saturation of the detector, or to quantify the analyte concentration within the calibration range of the instrument. Consequently, RLs are elevated in proportion to the dilution factor.
- Matrix interference may require that the sample be diluted to reduce or eliminate the interference. Consequently, the RLs are elevated in proportion to the dilution factor.

- The physical characteristics of the matrix do not permit concentration to the required final volume during sample preparation, resulting in a larger sample extract volume and, consequently, an elevation in RLs.
- Matrix interference may require the RLs be elevated because of the inability to quantify data below the elevated RL.

In a given sample, one or more of these effects may be exhibited. When the RLs have been elevated as a result of one or more of the above causes, surrogate or target compounds present at low concentrations may not be detected. Therefore, elevated RLs may cause limitations to the application of the data for its intended use. These limitations on data for contaminants of concern are discussed on a case-by-case basis.

### **5.3 DATA ASSESSMENT**

The assessment of data involves the consideration of data uses, the identification of data which were qualified or otherwise deviated from the Sauget A2 QAPP requirements, and the limitations associated with the evaluation of data in supporting decisions to be made.

#### **5.3.1 Summary of Data Quality Requirements**

Data collected in the corrective measures (CM) must be of known quality to support the uses for which it is intended. Data must meet the minimum quality standards to be useful in assessing the chemicals of concern, if any were released from the site, the acceptable level of uncertainty, and the concentrations in environmental media of concern at potential exposure points. Additionally, RLs must meet the levels necessary to determine whether analytes are present at concentrations of concern (i.e., above relative background concentrations, regulatory standards, or risk-based concentrations).

Inherent in providing defensible data is the need for a QA/QC program. The QA/QC program must have measurement tools so that data collected will be of known quality and legally defensible. QA/QC objectives for sampling and analysis were developed for this project which uses the following as indicators: precision, accuracy, completeness, comparability, representativeness, and sensitivity.

#### **5.3.2 Data Usability Assessment**

A determination of data usability was made with respect to project DQOs. Sampling issues and data review/validation issues were discussed in terms of appropriateness of using the data as



## **SECTION FIVE**

### **Data Review/Validation Process**

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intended, as well as making recommendations or limitations on data usage. These discussions address items such as elevated RLs, analytes suspected as laboratory contaminants, potential bias in results, and professional judgment utilized in the data review/validation. The data assessment summary is provided in Section 8 of this QCSR.



The A2 sampling activities from May, 2006 to July, 2006 resulted in the collection of 51 groundwater samples, 19 soil samples, 15 trip blank samples and 3 field blank samples. The sample results were submitted in multiple SDGs and are noted SAS044 through SAS049. The Dioxin sample results were submitted in one sample delivery group and given a unique name, beginning with G6G, followed by a six digit number. The samples were identified for the following parameters VOCs, SVOCs, PCBs (including congeners), pesticides, herbicides, metals and wet chemistry parameters. All samples were sent to STL in Savannah, GA; with the exception of the Dioxins which were sent to STL in Sacramento, CA.

Appendix C contains the data quality reviews for all samples. The data quality reviews have been organized by SDGs and parameters.

### **6.1 DATA QUALITY REVIEW CHECKLISTS FOR ALL SDGS**

SDGs were reviewed for each parameter separately. Appendix C contains the detailed review checklists for each parameter. In addition, a list of qualifiers for each SDG is provided at the end of the subsequent checklists for that SDG.



**7.1 INTRODUCTION**

Appendix C summarizes the full validation reports for ten percent of the chemical data for samples collected during the 2005 Sauget A2 field effort. The validation was completed in accordance with USEPA CLP National Functional Guidelines for Organic Data Review (USEPA 1999) and Inorganic Data Review (USEPA 2004), where applicable to SW-846 Methods. Additionally, QA/QC criteria established in the QAPP (URS 2004) was used.

**7.2 LEVEL IV VALIDATION OF DATA**

SDGs were validated at a rate of ten percent for each parameter. Appendix C contains the detailed validation checklists from each parameter.



**8.1 OVERALL DATA ASSESSMENT**

Quality issues for the data were assessed to evaluate their affect on the major data uses. In general, the objective of the sampling event was to gather data sufficient to evaluate data usability in support of the supplemental Phase II investigation.

Based on the criteria outlined, all data have met the DQOs and should be accepted for their intended use with the exception of those data qualified as rejected ®.

Overall precision, assessed by the analysis of LCS/LCSD RPD and MS/MSD RPD, was approximately 99 percent. Overall accuracy, assessed by the analysis of LCS, LCSD, MS, MSD and surrogate compounds, was approximately 99 percent. Representativeness, assessed by the analysis of field blank samples and field duplicate samples was also acceptable. One hundred percent of the field duplicate results were within criteria. Completeness, defined as the percentage of usable data (data not qualified as **R**), was approximately 99.9 percent. Comparability was acceptable as samples were analyzed using the standard operating procedures throughout the project duration. Therefore, the overall PARCC parameters were acceptable. Sensitivity, and its impact on data usability, is included in the report.

**8.2 SAMPLING ISSUES**

No sampling issues impacted data quality. Section 3 summarizes issues and documents that impact to the project DQO's.

**8.3 DATA REVIEW/VALIDATION ISSUES**

For laboratory analytical data, QA objectives were specified in the Sauget A2 QAPP (URS 2004). The QA objectives were used as indicators of the quality of data necessary to support identification and quantification of potential chemicals of concern. The data was reviewed and validated as identified in the QAPP (URS 2004). While the data review assessed the data based on the QC summary forms, the data validation was completed to determine if a more extensive review of the data indicated noncompliance with the method SOPs.

As presented in Appendix C, analytical results for some samples were qualified as **UJ** or **J** to indicate the quality control associated with that data did not meet evaluation criteria; however, they could be used for decision-making purposes. Analytical results were also qualified **R** could not be used for decision-making purposes. Analytical results were also qualified as **U** due to method blank, field blank, or trip blank contamination. Appendix C summarizes all

qualifications based on Data Quality Reviews and all qualifications based on Data Quality Validations.

#### **8.4 APPROPRIATENESS**

Analytical methodologies identified in Section 4 were utilized to help determine the presence of any chemicals of concern. With respect to the site description, the analytical methods utilized were appropriate to assess all chemicals of concern.

#### **8.5 LIMITATIONS**

Limitations occur when reporting limits have been elevated above the decision point, data were detected below reporting limits (resulting in estimated data), or when data were rejected. The summary of analytical data presented in Appendix A identifies the reporting limits for each sample analysis, and the qualifications associated with the data. The only limitations were the results flagged as rejected (**R**), these results were not used for decision-making purposes. Table 6-8 summarizes all qualifications to the data based on the data review and validation procedures.





## **SECTION NINE**

## **References**

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- U.S. Environmental Protection Agency (USEPA). 2005. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. SW846. Third Edition. Final Update IIIB.
- U.S. Environmental Protection Agency (USEPA). 1999. National Functional Guidelines for Organic Data Review. USEPA Contract Laboratory Program. EPA 540/R-9/008. October.
- U.S. Environmental Protection Agency (USEPA). 2004. National Functional Guidelines for Inorganic Data Review. USEPA Contract Laboratory Program. EPA 540/R/01/008. July.





TABLE 1-1

## Summary of Collected Samples Sauget Area 2

SDG	Sample ID	Sample Date	Sample Time	Matrix	Dioxins/Furans (SW8290)	VOC (8260B)	SVOC (8270C)	Pesticides (8081A)	PCB Homologs (680)	Herbicides (8151A)	Metals, Total (6010B)	Methane, Ethane, Ethene (RSK-175)	Alkalinity (310.1)	Carbon dioxide (310.1)	Nitrogen, Nitrate-Nitrite (353.2)	Sulfate (375.4)	Chloride (325.2)	Mercury (7470A/7471A)	Total Organic Carbon (9060)	Ammonia (350.1)
SAS044	SOIL-Q-21-SS-0.5'	5/3/06	1340	Soil		x	x			x	x							x		x
SAS044	SOIL-Q-21-SB-4'	5/3/06	1400	Soil		x	x			x	x							x		x
SAS044	TB-1	5/3/06	0000	Water		x														
SAS044	NAPL-C-31	5/8/06	1050	Soil		x	x												x	
SAS044	NAPL-C-139	5/8/06	1420	Soil		x	x												x	
SAS044	TB-2	5/8/06	0000	Water		x														
SAS044	NAPL-B-34	5/9/06	1250	Soil		x	x												x	
SAS044	NAPL-B-139	5/9/06	1510	Soil		x	x												x	
SAS044	TB-3	5/9/06	0000	Water		x														
SAS044	NAPL-A-40	5/10/06	940	Soil		x	x												x	
SAS044	NAPL-A-138	5/10/06	1310	Soil		x	x												x	
SAS044	TB-4	5/10/06	0000	Water		x														
SAS045	NAPL-A-(75-80)	5/15/06	850	Soil															x	
SAS045	NAPL-A-(95-100)	5/15/06	950	Soil															x	
SAS045	NAPL-A-(105-110)	5/15/06	1030	Soil															x	
SAS045	NAPL-B-(20-25)	5/16/06	830	Soil															x	
SAS045	NAPL-B-(80-85)	5/16/06	1003	Soil															x	
SAS045	NAPL-B-(110-115)	5/16/06	1035	Soil															x	
SAS045	NAPL-B-138	5/16/06	1120	Soil		x	x												x	
SAS045	NAPL-C-31-D	5/17/06	910	Soil		x	x												x	
SAS045	NAPL-C-(20-25)	5/17/06	847	Soil															x	
SAS045	NAPL-C-(65-70)	5/17/06	1030	Soil															x	
SAS045	NAPL-C-(100-105)	5/17/06	1115	Soil															x	
SAS045	TB-4	5/17/06	0000	Water		x														
SAS046	OSAA-I-26	6/2/06	850	Groundwater		x	x			x	x									x
SAS046	OSAA-I-46	6/2/06	950	Groundwater		x	x			x	x									x
SAS046	OSAA-I-66	6/2/06	1100	Groundwater		x	x			x	x									x
SAS046	OSAA-I-86	6/2/06	1203	Groundwater		x	x			x	x									x
SAS046	TB-6	6/2/06	0000	Water		x														
SAS046	OSAA-I-106	6/2/06	1410	Groundwater		x	x			x	x									x
SAS046	UAA-I-1-22	6/5/06	950	Groundwater		x	x			x	x									x
SAS046	UAA-I-1-42	6/5/06	1115	Groundwater		x	x			x	x									x
SAS046	UAA-I-1-62	6/5/06	1315	Groundwater		x	x			x	x									x
SAS046	UAA-I-1-62-D	6/5/06	1315	Groundwater		x	x			x	x									x
SAS046	TB-7	6/5/06	0000	Water		x														
SAS046	UAA-I-1-82	6/5/06	1445	Groundwater		x	x			x	x									x
SAS046	UAA-I-1-102	6/5/06	1610	Groundwater		x	x			x	x									x
SAS046	AA-P-10-22	6/6/06	1030	Groundwater		x	x			x	x									x
SAS046	AA-P-10-42	6/6/06	1130	Groundwater		x	x			x	x									x
SAS046	AA-P-10-62	6/6/06	1405	Groundwater		x	x			x	x									x
SAS046	TB-8	6/6/06	0000	Water		x														
SAS046	AA-P-10-82	6/6/06	1510	Groundwater		x	x			x	x									x
SAS046	AA-P-10-102	6/7/06	840	Groundwater		x	x			x	x									x
SAS046	AA-P-10-102-D	6/7/06	840	Groundwater		x	x			x	x									x
SAS046	AA-P-10-118.5	6/7/06	1045	Groundwater		x	x			x	x									x
SAS047	SA2-MW-1-D	6/28/06	1540	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS047	TB-9	6/28/06	0000	Water		x														
SAS048	SA2-MW-4-D	7/5/06	1459	Groundwater		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-1-M	7/5/06	940	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-1-M-D	7/5/06	940	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-1-S	7/5/06	1155	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	TB-10	7/5/06	0000	Water		x														
SAS048	SA2-MW-2-M	7/5/06	1510	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	TB-11	7/6/06	0000	Water		x														
SAS048	SA2-MW-2-D	7/6/06	1005	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-2-S	7/6/06	1330	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-8-D	7/6/06	1600	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-4-M	7/6/06	945	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x

TABLE 1-1

## Summary of Collected Samples Sauget Area 2

SDG	Sample ID	Sample Date	Sample Time	Matrix	Dioxins/Furans (SW8290)	VOC (8260B)	SVOC (8270C)	Pesticides (8081A)	PCB Homologs (680)	Herbicides (8151A)	Metals, Total (6010B)	Methane, Ethane, Ethene (RSK-175)	Alkalinity (310.1)	Carbon dioxide (310.1)	Nitrogen, Nitrate-Nitrite (353.2)	Sulfate (375.4)	Chloride (325.2)	Mercury (7470A/7471A)	Total Organic Carbon (9060)	Ammonia (350.1)
SAS048	SA2-MW-4-S	7/6/06	1345	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-3M-FB	7/6/06	1550	Water		x	x			x	x									x
SAS048	SA2-MW-10M-FB	7/6/06	1535	Water		x	x			x	x									x
SAS048	SA2-MW-3-M	7/7/06	855	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-3-S	7/7/06	1110	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-3-S-D	7/7/06	1110	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-3-D	7/7/06	1415	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-10M	7/7/06	900	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-10D	7/7/06	920	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-10S	7/7/06	1120	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS048	TB-12	7/7/06	0000	Water		x														
SAS049	TB-13	7/10/06	0000	Water		x														
SAS049	SA2-MW-6-M	7/10/06	1030	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-6-M-DUP	7/10/06	1030	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-6-D	7/10/06	1500	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-9-D	7/10/06	950	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-9-D-D	7/10/06	950	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-9-M	7/10/06	1430	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-9-S	7/10/06	1540	Groundwater		x	x													
SAS049	SA2-MW-5-D	7/11/06	1030	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-5-S	7/11/06	1232	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-5-M	7/11/06	1530	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	TB-14	7/11/06	0000	Water		x														
SAS049	SA2-MW-9-S	7/11/06	930	Groundwater						x										
SAS049	SA2-MW-7-M-FB	7/11/06	1125	Water		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-7-M	7/11/06	1435	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-7-D	7/11/06	1600	Groundwater		x	x			x	x	x	x	x	x	x	x	x	x	x
SAS049	TB-15	7/11/06	0000	Water		x														
SAS049	SA2-MW-9-S	7/12/06	1010	Groundwater							x		x	x	x	x	x	x	x	x
G6G070273	SA2-MW-4-D	7/5/06	1459	Groundwater	x															
G6G070273	SA2-MW-4-M	7/6/06	945	Groundwater	x															
G6G070273	SA2-MW-4-S	7/6/06	1345	Groundwater	x															

TABLE 2-1

## Summary of Field Duplicate Samples Sauget Area 2

SDG	Parent Sample ID	Duplicate Sample ID	Sample Date	Sample Time	Matrix	VOC (8260B)	SVOC (8270C)	Herbicides (8151A)	Metals, Total (6010B)	Methane, Ethane, Ethene (RSK-175)	Alkalinity (310.1)	Carbon dioxide (310.1)	Nitrogen, Nitrate-Nitrite (353.2)	Sulfate (375.4)	Chloride (325.2)	Mercury, Total (7470A/7471A)	Total Organic Carbon (9060)	Ammonia (350.1)
SAS046	UAA-11-62	UAA-11-62-D	6/5/06	1315	Groundwater	x	x	x	x									x
SAS046	AA-P-10-102	AA-P-10-102-D	6/7/06	840	Groundwater	x	x	x	x									x
SAS048	SA2-MW-1-M	SA2-MW-1-M-D	7/5/06	940	Groundwater	x	x	x	x	x	x	x	x	x	x	x	x	x
SAS048	SA2-MW-3-S	SA2-MW-3-S-D	7/7/06	1110	Groundwater	x	x	x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-6-M	SA2-MW-6-M-DUP	7/10/06	1030	Groundwater	x	x	x	x	x	x	x	x	x	x	x	x	x
SAS049	SA2-MW-9-D	SA2-MW-9-D-D	7/10/06	950	Groundwater	x	x	x	x	x	x	x	x	x	x	x	x	x

**TABLE 4-1**  
**Data Review/Validation Qualifier Codes**

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
c	Calibration failure, poor (RRF) or unstable (%D) response	b	Instrument performance failure or poor chromatography	c	Calibration failure
d	MS/MSD or LCS/LCSD RPD imprecision	c	Calibration failure, poor or unstable (%D) response	d	MS/MSD or LCS/LCSD RPD imprecision
e	Sample preservation or cooler temperature failure	d	MS/MSD or LCS/LCSD RPD imprecision	e	Sample preservation or cooler temperature failure
f	Field duplicate imprecision	e	Sample preservation or cooler temperature failure	f	Field duplicate imprecision
h	Holding time violation	f	Field duplicate imprecision	h	Holding time violation
j	Tuning Failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
l	LCS recovery failure	h	Holding time violation	l	LCS recovery failure
m	MS/MSD recovery failure	i	LCS recovery failure	m	MS/MSD recovery failure
n	Internal standard failure	m	MS/MSD recovery failure	n	ICP interference check sample failure
p	Air bubble (> 6 mm or ¼ inch) in VOC vials	p	Air bubble (>6 mm or 1/4 inch) in VOC vials	o	Calibration blank contamination
q	Concentration exceeded the linear range	q	Concentration exceeded the linear range	p	Preparation blank contamination
r	linearity (%RSD or r) failure in initial calibration	r	Linearity (%RSD or r) failure in initial calibration	q	Concentration exceeded the linear range
s	Surrogate failure	s	Surrogate failure	r	Linearity failure in calibration or MSA
t	Tentatively identified Compound	u	No confirmation column	s	Serial dilution failure
w	Identification criteria failure	w	Identification criteria failure	v	Post-digestion spike failure
x	Field and/or equipment blank contamination	x	Field and/or equipment blank contamination	w	CRDL standard recovery failure
y	Trip blank contamination	y	Trip blank contamination	x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination	z	Method blank and/or storage blank contamination	z	Laboratory storage blank contamination
Q	Other — see bottom of data report for explanation	Q	Other — see bottom of data report for explanation	Q	Other - see bottom of data report for explanation

The reason code indicates the type of quality control failure that lead to the application of the data validation flag.



TABLE 6-1

## Summary of Qualifications for SDG SAS044

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
SAS044	NAPL-C-139	VOCs	Chloromethane	UJ	S	
SAS044	NAPL-C-139	VOCs	Bromomethane	UJ	S	
SAS044	NAPL-C-139	VOCs	Vinyl chloride	UJ	S	
SAS044	NAPL-C-139	VOCs	Chloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	Methylene chloride	UJ	S	
SAS044	NAPL-C-139	VOCs	Carbon disulfide	J	S	
SAS044	NAPL-C-139	VOCs	1,1-Dichloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	1,1-Dichloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	cis-1,2-Dichloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	trans-1,2-Dichloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	Chloroform	UJ	S	
SAS044	NAPL-C-139	VOCs	1,2-Dichloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	1,1,1-Trichloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	Carbon tetrachloride	UJ	S	
SAS044	NAPL-C-139	VOCs	Bromodichloromethane	UJ	S	
SAS044	NAPL-C-139	VOCs	1,1,2,2-Tetrachloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	1,2-Dichloropropane	UJ	S	
SAS044	NAPL-C-139	VOCs	trans-1,3-Dichloropropene	UJ	S	
SAS044	NAPL-C-139	VOCs	trichloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	Dibromochloromethane	UJ	S	
SAS044	NAPL-C-139	VOCs	cis-1,3-Dichloropropene	UJ	S	
SAS044	NAPL-C-139	VOCs	Bromoform	UJ	S	
SAS044	NAPL-C-139	VOCs	2-Hexanone	UJ	S	
SAS044	NAPL-C-139	VOCs	4-Methyl-2-pentanone	UJ	S	
SAS044	NAPL-C-139	VOCs	Tetrachloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	Chlorobenzene	J	S	
SAS044	NAPL-C-139	VOCs	Styrene	UJ	S	
SAS044	Soil-Q-21-SB-4'	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	Soil-Q-21-SS-0.5	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-C-31	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-C-139	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-B-34	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-B-139	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-A-40	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-A-138	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	Soil-Q-21-SB-4'	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	Soil-Q-21-SS-0.5	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-C-31	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-C-139	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-B-34	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-B-139	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-A-40	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-A-138	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	Soil-Q-21-SB-4'	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	Soil-Q-21-SS-0.5	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-C-31	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-C-139	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-B-34	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-B-139	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-A-138	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-A-40	SVOCs	4,6-Dinitro-2-methylphenol	R	C	
SAS044	NAPL-A-40	SVOCs	Benzo[k]fluoranthene	UJ	C	
SAS044	NAPL-A-40	SVOCs	Dinoseb	R	C	
SAS044	NAPL-A-40	SVOCs	Bis(2-ethylhexyl)phthalate	U	Z	
SAS044	Soil-Q-21-SS-0.5	SVOCs	2,4-Dinitrophenol	R	M	
SAS044	Soil-Q-21-SS-0.5	SVOCs	Pentachlorophenol	R	M	
SAS044	Soil-Q-21-SS-0.5	Herbicides	MCPA	UJ	r	
SAS044	Soil-Q-21-SB-4'	Herbicides	MCPA	UJ	r	
SAS044	Soil-Q-21-SB-4'	Metals	Sodium	U	p	

**TABLE 6-1**

**Summary of Qualifications for SDG SAS044**

<b>SDG</b>	<b>Sample ID</b>	<b>Analysis</b>	<b>Analyte</b>	<b>URS Qual.</b>	<b>Code</b>	<b>New RL</b>
SAS044	Soil-Q-21-SS-0.5	General Chemistry	Ammonia	J	m	

**Notes:**

R = Rejected

J = Estimated

UJ = Estimated non-detect

U = Non-detect

**TABLE 6-2**

**Summary of Qualifications for SDG SAS045**

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
SAS045	NAPL-B-138	VOCs	Acetone	J	C	
SAS045	NAPL-B-138	VOCs	Carbon Disulfide	J	C	
SAS045	NAPL-C-31-DDL	VOCs	Chlorobenzene	J	S	
SAS045	NAPL-B-138	SVOCs	Bis(2-ethylhexyl) phthalate	U	Z	
SAS045	NAPL-C-31-D	SVOCs	Bis(2-ethylhexyl) phthalate	U	Z	
SAS045	NAPL-B-138	SVOCs	2,4-Dinitrophenol	UJ	C	
SAS045	NAPL-C-31-D	SVOCs	Benzo(b)fluoranthene	UJ	C	

Notes:

R = Rejected

J = Estimated

UJ = Estimated non-detect

U = Non-detect

TABLE 6-3

## Summary of Qualifications for SDG SAS046

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
SAS046	OSAA-1-26	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-26	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-46	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-46	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-66	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-66	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-86	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-86	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-106	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-106	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-22	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-22	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-42	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-42	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-62	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-62	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-62-D	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-62-D	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-82	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-82	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-102	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-102	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-22	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-22	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-42	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-42	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-82	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-82	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-102	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-102	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-102-D	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-102-D	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-118.5	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-118.5	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-26	SVOCs	All SVOCs	UJ	H	
SAS046	OSAA-1-46	SVOCs	All SVOCs	UJ	H	
SAS046	OSAA-1-66	SVOCs	All SVOCs	UJ	H	
SAS046	UAA-11-22	SVOCs	All nondetects	UJ	S	
SAS046	UAA-11-102	SVOCs	1,4-Dichlorobenzene	J	S	
SAS046	AA-P-10-42	Herbicides	Pentachlorophenol	R	m	
SAS046	OSAA-1-46	Metals	Beryllium	U	o	
SAS046	OSAA-1-86	Metals	Beryllium	U	o	
SAS046	OSAA-1-106	Metals	Beryllium	U	o	
SAS046	AA-P-10-62	Metals	Beryllium	U	o	
SAS046	AA-P-10-82	Metals	Beryllium	U	o	
SAS046	AA-P-10-102	Metals	Beryllium	U	o	
SAS046	AA-10-102-D	Metals	Beryllium	U	o	
SAS046	AA-P-10-118.5	Metals	Beryllium	U	o	
SAS046	All metals	Metals	Barium	J	n	
SAS046	All metals	Metals	Chromium	J	n	
SAS046	All metals	Metals	Manganese	J	n	
SAS046	All metals	Metals	Vanadium	J	n	
SAS046	All metals	Metals	Zinc	J	n	
SAS046	AA-P-10-42	Metals	Aluminum	J	k	
SAS046	AA-P-10-42	Metals	Potassium	J	m	

Notes:

R = Rejected

J = Estimated

UJ = Estimated non-detect

U = Non-detect

**TABLE 6-4****Summary of Qualifications for SDG SAS047**

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
SAS047	SA2-MW-1-D	VOCs	Acetone	UJ	C	
SAS047	SA2-MW-1-D	VOCs	2-butanone	UJ	C	
SAS047	SA2-MW-1-D	SVOCs	3-Nitroaniline	UJ	L	
SAS047	SA2-MW-1-D	SVOCs	3,3'-Dichlorobenzidine	R	L	
SAS047	SA2-MW-1-D	Metals	Chromium	U	o	
SAS047	SA2-MW-1-D	Metals	Copper	U	o	
SAS047	SA2-MW-1-D	Metals	Lead	UJ	o	
SAS047	SA2-MW-1-D	Metals	Potassium	J	s	
SAS047	SA2-MW-1-D	Wet chemistry	Nitrate	UJ	h	
SAS047	SA2-MW-1-D	Wet chemistry	Nitrite	R	h	

**Notes:**

R = Rejected

J = Estimated

UJ = Estimated non-detect

U = Non-detect

TABLE 6-5

## Summary of Qualifications for SDG SAS048

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
SAS048	SA2-MW-4-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-1-M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-1-M-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-1-S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-2-M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-2-D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-2-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-2-D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-2-S	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-2-S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-2-S	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-8-D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-8-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-8-D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-4-M	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-4-M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-4-M	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-4-S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-4-S	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-4-S	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-3-M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-3-M	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-3-M	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-3-S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-3-S	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-3-S	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-3-S-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-3-S-D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-3-S-D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-3-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-3-D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-3-D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-10M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-10M	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-10M	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-10D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-10D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-10D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-10S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-10S	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-4-D	Pesticides	All Pesticides	UJ	s	
SAS048	SA2-MW-4-D	PCBs	All PCBs	UJ	l	
SAS048	SA2-MW-1-M	Metals	Chromium	U	o	
SAS048	SA2-MW-1-M-D	Metals	Chromium	U	o	
SAS048	SA2-MW-1-S	Metals	Copper	U	o	
SAS048	SA2-MW-2-M	Metals	Chromium	U	o	
SAS048	SA2-MW-2-S	Metals	Chromium	U	o	
SAS048	SA2-MW-2-S	Metals	Copper	U	o	
SAS048	SA2-MW-8-D	Metals	Chromium	U	o	
SAS048	SA2-MW-4-M	Metals	Chromium	U	o	
SAS048	SA2-MW-4-S	Metals	Chromium	U	o	
SAS048	SA2-MW-3-M	Metals	Chromium	U	o	
SAS048	SA2-MW-3-S	Metals	Chromium	U	o	
SAS048	SA2-MW-3-S	Metals	Copper	U	o	
SAS048	SA2-MW-3-S-D	Metals	Chromium	U	o	
SAS048	SA2-MW-3-S-D	Metals	Copper	U	o	
SAS048	SA2-MW-10M	Metals	Chromium	U	o	

**TABLE 6-5****Summary of Qualifications for SDG SAS048**

<b>SDG</b>	<b>Sample ID</b>	<b>Analysis</b>	<b>Analyte</b>	<b>URS Qual.</b>	<b>Code</b>	<b>New RL</b>
SAS048	SA2-MW-10D	Metals	Chromium	U	o	
SAS048	SA2-MW-10S	Metals	Copper	U	o	
SAS048	SA2-MW-10S	Metals	Chromium	U	o	
SAS048	SA2-MW-10S	Herbicides	Pentachlorophenol	R	m	
SAS048	SA2-MW-3-M	Wet chemistry	Total Organic Carbon	U	x	

**Notes:**

R = Rejected

J = Estimated

UJ = Estimated non-detect

U = Non-detect

TABLE 6-6

## Summary of Qualifications for SDG SAS049

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
SAS049	SA2-MW-9-S	VOCs	Carbon disulfide	J	L	
SAS049	SA2-MW-6-M	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-6-M-Dup	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-6-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-9-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-9-D-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-9-M	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-9-S	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-5-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-5-S	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-5-M	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-7-M	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-7-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-6-D	Metals	Aluminum	U	o	
SAS049	SA2-MW-9-D	Metals	Aluminum	U	o	
SAS049	SA2-MW-9-D-D	Metals	Aluminum	U	o	
SAS049	SA2-MW-5-D	Metals	Aluminum	U	o	

## Notes:

R = Rejected

J = Estimated

UJ = Estimated non-detect

U = Non-detect



**TABLE 6-7**

**Summary of Qualifications for SDG G6G070273**

<b>SDG</b>	<b>Sample ID</b>	<b>Analysis</b>	<b>Analyte</b>	<b>URS Qual.</b>	<b>Code</b>	<b>New RL</b>
G6G070273	No Qualifications					

Notes:

R = Rejected

J = Estimated

UJ = Estimated non-detect

U = Non-detect

TABLE 6-8

## Summary of Qualifications for SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Analysis	Analyte	URS Qual	Code	New RL
SAS044	NAPL-C-139	VOCs	Chloromethane	UJ	S	
SAS044	NAPL-C-139	VOCs	Bromomethane	UJ	S	
SAS044	NAPL-C-139	VOCs	Vinyl chloride	UJ	S	
SAS044	NAPL-C-139	VOCs	Chloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	Methylene chloride	UJ	S	
SAS044	NAPL-C-139	VOCs	Carbon disulfide	J	S	
SAS044	NAPL-C-139	VOCs	1,1-Dichloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	1,1-Dichloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	cis-1,2-Dichloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	trans-1,2-Dichloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	Chloroform	UJ	S	
SAS044	NAPL-C-139	VOCs	1,2-Dichloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	1,1,1-Trichloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	Carbon tetrachloride	UJ	S	
SAS044	NAPL-C-139	VOCs	Bromodichloromethane	UJ	S	
SAS044	NAPL-C-139	VOCs	1,1,2,2-Tetrachloroethane	UJ	S	
SAS044	NAPL-C-139	VOCs	1,2-Dichloropropane	UJ	S	
SAS044	NAPL-C-139	VOCs	trans-1,3-Dichloropropene	UJ	S	
SAS044	NAPL-C-139	VOCs	trichloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	Dibromochloromethane	UJ	S	
SAS044	NAPL-C-139	VOCs	cis-1,3-Dichloropropene	UJ	S	
SAS044	NAPL-C-139	VOCs	Bromoform	UJ	S	
SAS044	NAPL-C-139	VOCs	2-Hexanone	UJ	S	
SAS044	NAPL-C-139	VOCs	4-Methyl-2-pentanone	UJ	S	
SAS044	NAPL-C-139	VOCs	Tetrachloroethene	UJ	S	
SAS044	NAPL-C-139	VOCs	Chlorobenzene	J	S	
SAS044	NAPL-C-139	VOCs	Styrene	UJ	S	
SAS044	Soil-Q-21-SB-4'	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	Soil-Q-21-SS-0.5	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-C-31	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-C-139	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-B-34	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-B-139	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-A-40	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	NAPL-A-138	SVOCs	2,4-Dinitrotoluene	UJ	C	
SAS044	Soil-Q-21-SB-4'	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	Soil-Q-21-SS-0.5	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-C-31	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-C-139	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-B-34	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-B-139	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-A-40	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	NAPL-A-138	SVOCs	2,6-Dinitrotoluene	UJ	C	
SAS044	Soil-Q-21-SB-4'	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	Soil-Q-21-SS-0.5	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-C-31	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-C-139	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-B-34	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-B-139	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-A-138	SVOCs	4,6-Dinitro-2-methylphenol	UJ	C	
SAS044	NAPL-A-40	SVOCs	4,6-Dinitro-2-methylphenol	R	C	
SAS044	NAPL-A-40	SVOCs	Benzo[k]fluoranthene	UJ	C	
SAS044	NAPL-A-40	SVOCs	Dinoseb	R	C	
SAS044	NAPL-A-40	SVOCs	Bis(2-ethylhexyl) phthalate	U	Z	
SAS044	Soil-Q-21-SS-0.5	SVOCs	2,4-Dinitrophenol	R	M	
SAS044	Soil-Q-21-SS-0.5	SVOCs	Pentachlorophenol	R	M	
SAS044	Soil-Q-21-SS-0.5	Herbicides	MCPA	UJ	r	
SAS044	Soil-Q-21-SB-4'	Herbicides	MCPA	UJ	r	
SAS044	Soil-Q-21-SB-4'	Metals	Sodium	U	p	
SAS044	Soil-Q-21-SS-0.5	General Chemistry	Ammonia	J	m	
SAS045	NAPL-B-138	VOCs	Acetone	J	C	
SAS045	NAPL-B-138	VOCs	Carbon Disulfide	J	C	
SAS045	NAPL-C-31-DDL	VOCs	Chlorobenzene	J	S	
SAS045	NAPL-B-138	SVOCs	Bis(2-ethylhexyl) phthalate	U	Z	
SAS045	NAPL-C-31-D	SVOCs	Bis(2-ethylhexyl) phthalate	U	Z	
SAS045	NAPL-B-138	SVOCs	2,4-Dinitrophenol	UJ	C	
SAS045	NAPL-C-31-D	SVOCs	Benzo(b)fluoranthene	UJ	C	
SAS046	OSAA-1-26	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-26	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-46	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-46	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-66	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-66	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-86	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-86	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-106	VOCs	Chloromethane	UJ	C	
SAS046	OSAA-1-106	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-22	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-22	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-42	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-42	VOCs	Bromomethane	UJ	C	

TABLE 6-8

## Summary of Qualifications for SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Analysis	Analyte	URS Qual	Code	New RL
SAS046	UAA-11-62	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-62	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-62-D	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-62-D	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-82	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-82	VOCs	Bromomethane	UJ	C	
SAS046	UAA-11-102	VOCs	Chloromethane	UJ	C	
SAS046	UAA-11-102	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-22	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-22	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-42	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-42	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-82	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-82	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-102	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-102	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-102-D	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-102-D	VOCs	Bromomethane	UJ	C	
SAS046	AA-P-10-118.5	VOCs	Chloromethane	UJ	C	
SAS046	AA-P-10-118.5	VOCs	Bromomethane	UJ	C	
SAS046	OSAA-1-26	SVOCs	All SVOCs	UJ	H	
SAS046	OSAA-1-46	SVOCs	All SVOCs	UJ	H	
SAS046	OSAA-1-66	SVOCs	All SVOCs	UJ	H	
SAS046	UAA-11-22	SVOCs	All nondetects	UJ	S	
SAS046	UAA-11-102	SVOCs	1,4-Dichlorobenzene	J	S	
SAS046	AA-P-10-42	Herbicides	Pentachlorophenol	R	m	
SAS046	OSAA-1-46	Metals	Beryllium	U	o	
SAS046	OSAA-1-86	Metals	Beryllium	U	o	
SAS046	OSAA-1-106	Metals	Beryllium	U	o	
SAS046	AA-P-10-62	Metals	Beryllium	U	o	
SAS046	AA-P-10-82	Metals	Beryllium	U	o	
SAS046	AA-P-10-102	Metals	Beryllium	U	o	
SAS046	AA-10-102-D	Metals	Beryllium	U	o	
SAS046	AA-P-10-118.5	Metals	Beryllium	U	o	
SAS046	All metals	Metals	Barium	J	n	
SAS046	All metals	Metals	Chromium	J	n	
SAS046	All metals	Metals	Manganese	J	n	
SAS046	All metals	Metals	Vanadium	J	n	
SAS046	All metals	Metals	Zinc	J	n	
SAS046	AA-P-10-42	Metals	Aluminum	J	k	
SAS046	AA-P-10-42	Metals	Potassium	J	m	
SAS047	SA2-MW-1-D	VOCs	Acetone	UJ	C	
SAS047	SA2-MW-1-D	VOCs	2-butanone	UJ	C	
SAS047	SA2-MW-1-D	SVOCs	3-Nitroaniline	UJ	L	
SAS047	SA2-MW-1-D	SVOCs	3,3'-Dichlorobenzidine	R	L	
SAS047	SA2-MW-1-D	Metals	Chromium	U	o	
SAS047	SA2-MW-1-D	Metals	Copper	U	o	
SAS047	SA2-MW-1-D	Metals	Lead	UJ	o	
SAS047	SA2-MW-1-D	Metals	Potassium	J	s	
SAS047	SA2-MW-1-D	Wet chemistry	Nitrate	UJ	h	
SAS047	SA2-MW-1-D	Wet chemistry	Nitrite	R	h	
SAS048	SA2-MW-4-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-1-M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-1-M-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-1-S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-2-M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-2-D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-2-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-2-D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-2-S	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-2-S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-2-S	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-8-D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-8-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-8-D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-4-M	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-4-M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-4-M	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-4-S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-4-S	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-4-S	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-3-M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-3-M	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-3-M	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-3-S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-3-S	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-3-S	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-3-S-D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-3-S-D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-3-S-D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-3-D	VOCs	2-Butanone	UJ	C	

TABLE 6-8

## Summary of Qualifications for SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Analysis	Analyte	URS Qual	Code	New RL
SAS048	SA2-MW-3-D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-3-D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-10M	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-10M	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-10M	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-10D	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-10D	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-10D	VOCs	Bromomethane	UJ	C	
SAS048	SA2-MW-10S	VOCs	2-Butanone	UJ	C	
SAS048	SA2-MW-10S	VOCs	4-Methyl-2-Pentanone	UJ	C	
SAS048	SA2-MW-4-D	Pesticides	All Pesticides	UJ	s	
SAS048	SA2-MW-4-D	PCBs	All PCBs	UJ	l	
SAS048	SA2-MW-1-M	Metals	Chromium	U	o	
SAS048	SA2-MW-1-M-D	Metals	Chromium	U	o	
SAS048	SA2-MW-1-S	Metals	Copper	U	o	
SAS048	SA2-MW-2-M	Metals	Chromium	U	o	
SAS048	SA2-MW-2-S	Metals	Chromium	U	o	
SAS048	SA2-MW-2-S	Metals	Copper	U	o	
SAS048	SA2-MW-8-D	Metals	Chromium	U	o	
SAS048	SA2-MW-4-M	Metals	Chromium	U	o	
SAS048	SA2-MW-4-S	Metals	Chromium	U	o	
SAS048	SA2-MW-3-M	Metals	Chromium	U	o	
SAS048	SA2-MW-3-S	Metals	Chromium	U	o	
SAS048	SA2-MW-3-S	Metals	Copper	U	o	
SAS048	SA2-MW-3-S-D	Metals	Chromium	U	o	
SAS048	SA2-MW-3-S-D	Metals	Copper	U	o	
SAS048	SA2-MW-10M	Metals	Chromium	U	o	
SAS048	SA2-MW-10D	Metals	Chromium	U	o	
SAS048	SA2-MW-10S	Metals	Copper	U	o	
SAS048	SA2-MW-10S	Metals	Chromium	U	o	
SAS048	SA2-MW-10S	Herbicides	Pentachlorophenol	R	m	
SAS048	SA2-MW-3-M	Wet chemistry	Total Organic Carbon	U	x	
SAS049	SA2-MW-9-S	VOCs	Carbon disulfide	J	L	
SAS049	SA2-MW-6-M	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-6-M-Dup	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-6-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-9-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-9-D-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-9-M	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-9-S	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-5-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-5-S	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-5-M	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-7-M	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-7-D	VOCs	Bromomethane	UJ	C	
SAS049	SA2-MW-6-D	Metals	Aluminum	U	o	
SAS049	SA2-MW-9-D	Metals	Aluminum	U	o	
SAS049	SA2-MW-9-D-D	Metals	Aluminum	U	o	
SAS049	SA2-MW-5-D	Metals	Aluminum	U	o	





TABLE A-1

SDC	Sample ID	Matrix	Parameter	Chemical	Result	URS Qual. Code	RL
SAS044	NAPL-C-139	Soil	VOCs	Chloromethane	1.7	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	Bromomethane	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	Vinyl chloride	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	Chloroform	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	trans-1,2-Dichloroethene	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	cis-1,2-Dichloroethene	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	1,1-Dichloroethane	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	1,1,1-Trichloroethane	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	Carbon tetrachloride	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	Bromodichloromethane	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	1,1,2,2-Tetrachloroethane	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	1,2-Dichloropropane	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	trans-1,3-Dichloropropene	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	Dibromochloromethane	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	cis-1,3-Dichloropropene	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	Bromoforn	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	2-Hexanone	19	URS	19
SAS044	NAPL-C-139	Soil	VOCs	4-Methyl-2-pentanone	19	URS	19
SAS044	NAPL-C-139	Soil	VOCs	Tetrachloroethene	3.8	URS	3.8
SAS044	NAPL-C-139	Soil	VOCs	Styrene	3.8	URS	3.8
SAS044	Soil-Q-21-SB-4	Soil	SVOCs	2,4-Dinitroethene	410	URS	3.8
SAS044	Soil-Q-21-SB-0.5	Soil	SVOCs	2,4-Dinitroethene	3900	URS	3.8
SAS044	NAPL-C-31	Soil	SVOCs	2,6-Dinitroethene	450	URS	450
SAS044	NAPL-B-34	Soil	SVOCs	2,6-Dinitroethene	380	URS	380
SAS044	NAPL-B-139	Soil	SVOCs	2,6-Dinitroethene	370	URS	370
SAS044	NAPL-A-40	Soil	SVOCs	2,6-Dinitroethene	390	URS	390
SAS044	NAPL-A-138	Soil	SVOCs	2,6-Dinitroethene	370	URS	370
SAS044	Soil-Q-21-SB-4	Soil	SVOCs	2,6-Dinitroethene	2100	URS	2100
SAS044	Soil-Q-21-SB-0.5	Soil	SVOCs	2,6-Dinitroethene	20000	URS	20000
SAS044	NAPL-C-31	Soil	SVOCs	4,6-Dinitro-2-methylphenol	2300	URS	2300
SAS044	NAPL-C-139	Soil	SVOCs	4,6-Dinitro-2-methylphenol	2000	URS	2000
SAS044	NAPL-B-34	Soil	SVOCs	4,6-Dinitro-2-methylphenol	1900	URS	1900
SAS044	NAPL-B-139	Soil	SVOCs	4,6-Dinitro-2-methylphenol	2000	URS	2000
SAS044	NAPL-A-138	Soil	SVOCs	4,6-Dinitro-2-methylphenol	1900	URS	1900
SAS044	NAPL-A-40	Soil	SVOCs	4,6-Dinitro-2-methylphenol	2000	URS	2000
SAS044	NAPL-A-40	Soil	SVOCs	Benzol[k]fluoranthene	390	URS	390
SAS044	NAPL-A-40	Soil	SVOCs	Dibenz[a,h]fluoranthene	390	URS	390
SAS044	NAPL-A-40	Soil	SVOCs	Bis(2-ethylhexyl)phthalate	68	URS	390
SAS044	Soil-Q-21-SB-0.5	Soil	SVOCs	2,4-Dinitrophenol	20000	R.M	20000
SAS044	Soil-Q-21-SB-0.5	Soil	SVOCs	Pentachlorophenol	20000	R.M	20000
SAS044	Soil-Q-21-SB-4	Soil	Herbicides	MCPA	4800	URS	4800
SAS044	Soil-Q-21-SB-4	Soil	Herbicides	MCPA	2500	URS	2500
SAS044	Soil-Q-21-SB-0.5	Soil	Metals	Sodium	350	URS	110
SAS044	Soil-Q-21-SB-0.5	Soil	General Chemistry	Ammonia	0.81	URS	0.18
SAS045	NAPL-B-138	Soil	VOCs	Acetone	35	URS	31
SAS045	NAPL-B-138	Soil	VOCs	Carbon disulfide	5.5	URS	3.1
SAS045	NAPL-C-31-DL	Soil	VOCs	Chlorobenzene	8300	URS	310
SAS045	NAPL-B-138	Soil	SVOCs	Bis(2-ethylhexyl) phthalate	250	URS	250
SAS045	NAPL-C-31-D	Soil	SVOCs	2,4-Dinitrophenol	1900	URS	1900
SAS045	NAPL-C-31-D	Soil	SVOCs	Benzol[b]fluoranthene	430	URS	430
SAS046	OSAA-1-26	Groundwater	VOCs	Chloromethane	1	URS	1
SAS046	OSAA-1-46	Groundwater	VOCs	Chloromethane	1	URS	1
SAS046	OSAA-1-46	Groundwater	VOCs	Bromomethane	1	URS	1
SAS046	OSAA-1-66	Groundwater	VOCs	Chloromethane	1	URS	1
SAS046	OSAA-1-86	Groundwater	VOCs		1	URS	1
SAS046	OSAA-1-106	Groundwater	VOCs	Chloromethane	1	URS	1
SAS046	OSAA-1-106	Groundwater	VOCs	Bromomethane	1	URS	1
SAS046	UAA-11-22	Groundwater	VOCs	Chloromethane	1	URS	1
SAS046	UAA-11-22	Groundwater	VOCs	Bromomethane	1	URS	1
SAS046	UAA-11-42	Groundwater	VOCs	Chloromethane	1	URS	1
SAS046	UAA-11-42	Groundwater	VOCs	Bromomethane	1	URS	1
SAS046	UAA-11-62	Groundwater	VOCs	Chloromethane	1	URS	1

TABLE A-1

## Analytical Results SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Matrix	Parameter	Chemical	Result	URS Qual. Code	RL
SAS046	UAA-11-62	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	UAA-11-62-D	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	UAA-11-62-D	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	UAA-11-82	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	UAA-11-82	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	UAA-11-102	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	UAA-11-102	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	AA-P-10-22	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	AA-P-10-22	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	AA-P-10-42	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	AA-P-10-42	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	AA-P-10-82	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	AA-P-10-82	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	AA-P-10-102	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	AA-P-10-102	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	AA-P-10-102-D	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	AA-P-10-102-D	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	AA-P-10-118.5	Groundwater	VOCs	Chloromethane	1	UJ,C	1
SAS046	AA-P-10-118.5	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS046	OSAA-1-26	Groundwater	SVOCs	Phenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Bis(2-chloroethyl)ether	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2-Chlorophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	1,3-Dichlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	1,4-Dichlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	1,2-Dichlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2-Methylphenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	3 & 4 Methylphenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	N-Nitrosodi-n-propylamine	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Hexachloroethane	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Nitrobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Isophorone	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2-Nitrophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2,4-Dimethylphenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Bis(2-chloroethoxy)methane	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2,4-Dichlorophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	1,2,4-Trichlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Naphthalene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	4-Chloroaniline	19	UJ,H	19
SAS046	OSAA-1-26	Groundwater	SVOCs	Hexachlorobutadiene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	4-Chloro-3-methylphenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2-Methylnaphthalene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Hexachlorocyclopentadiene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2,4,6-Trichlorophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2,4,5-Trichlorophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2-Chlorophthalene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-26	Groundwater	SVOCs	Dimethyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Acenaphthylene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	3-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-26	Groundwater	SVOCs	Acenaphthene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2,4-Dinitrophenol	48	UJ,H	48
SAS046	OSAA-1-26	Groundwater	SVOCs	4-Nitrophenol	48	UJ,H	48
SAS046	OSAA-1-26	Groundwater	SVOCs	Dibenzofuran	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2,4-Dinitrotoluene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	2,6-Dinitrotoluene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Diethyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	4-Chlorophenyl phenyl ether	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Fluorene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	4-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-26	Groundwater	SVOCs	4,6-Dinitro-2-methylphenol	48	UJ,H	48
SAS046	OSAA-1-26	Groundwater	SVOCs	N-Nitrosodiphenylamine	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	4-Bromophenyl phenyl ether	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Hexachlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Pentachlorophenol	48	UJ,H	48
SAS046	OSAA-1-26	Groundwater	SVOCs	Phenanthrene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Anthracene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Di-n-butyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Fluoranthene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Pvrene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Butyl benzyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	3,3'-Dichlorobenzidine	19	UJ,H	19
SAS046	OSAA-1-26	Groundwater	SVOCs	Benzo[a]anthracene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Bis(2-ethylhexyl) phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Chrysene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Di-n-octyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Benzo[b]fluoranthene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Benzo[k]fluoranthene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Benzo[a]pyrene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Indeno[1,2,3-cd]pyrene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Dibenz[a,h]anthracene	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Benzo[g,h,i]perylene	9.5	UJ,H	9.5



TABLE A-1

## Analytical Results SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Matrix	Parameter	Chemical	Result	URS Qual. Code	RL
SAS046	OSAA-1-26	Groundwater	SVOCs	Carbazole	9.5	UJ,H	9.5
SAS046	OSAA-1-26	Groundwater	SVOCs	Dinoseb	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Phenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Bis(2-chloroethyl)ether	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2-Chlorophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	1,3-Dichlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	1,4-Dichlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	1,2-Dichlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2-Methylphenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	3 & 4 Methylphenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	N-Nitrosodi-n-propylamine	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Hexachloroethane	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Nitrobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Isophorone	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2-Nitrophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2,4-Dimethylphenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Bis(2-chloroethoxy)methane	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2,4-Dichlorophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	1,2,4-Trichlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Naphthalene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	4-Chloroaniline	19	UJ,H	19
SAS046	OSAA-1-46	Groundwater	SVOCs	Hexachlorobutadiene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	4-Chloro-3-methylphenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2-Methylnaphthalene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Hexachlorocyclopentadiene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2,4,6-Trichlorophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2,4,5-Trichlorophenol	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2-Chlorophthalene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-46	Groundwater	SVOCs	Dimethyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Acenaphthylene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	3-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-46	Groundwater	SVOCs	Acenaphthene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2,4-Dinitrophenol	48	UJ,H	48
SAS046	OSAA-1-46	Groundwater	SVOCs	4-Nitrophenol	48	UJ,H	48
SAS046	OSAA-1-46	Groundwater	SVOCs	Dibenzofuran	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2,4-Dinitrotoluene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	2,6-Dinitrotoluene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Diethyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	4-Chlorophenyl phenyl ether	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Fluorene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	4-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-46	Groundwater	SVOCs	4,6-Dinitro-2-methylphenol	48	UJ,H	48
SAS046	OSAA-1-46	Groundwater	SVOCs	N-Nitrosodiphenylamine	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	4-Bromophenyl phenyl ether	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Hexachlorobenzene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Pentachlorophenol	48	UJ,H	48
SAS046	OSAA-1-46	Groundwater	SVOCs	Phenanthrene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Anthracene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Di-n-butyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Fluoranthene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Pyrene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Butyl benzyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	3,3'-Dichlorobenzidine	19	UJ,H	19
SAS046	OSAA-1-46	Groundwater	SVOCs	Benzo[a]anthracene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Bis(2-ethylhexyl) phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Chrysene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Di-n-octyl phthalate	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Benzo[b]fluoranthene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Benzo[k]fluoranthene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Benzo[a]pyrene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Indeno[1,2,3-cd]pyrene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Dibenz[a,h]anthracene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Benzo[g,h,i]perylene	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Carbazole	9.5	UJ,H	9.5
SAS046	OSAA-1-46	Groundwater	SVOCs	Dinoseb	9.5	UJ,H	9.5
SAS046	OSAA-1-66	Groundwater	SVOCs	Phenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Bis(2-chloroethyl)ether	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2-Chlorophenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	1,3-Dichlorobenzene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	1,4-Dichlorobenzene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	1,2-Dichlorobenzene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2-Methylphenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	3 & 4 Methylphenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	N-Nitrosodi-n-propylamine	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Hexachloroethane	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Nitrobenzene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Isophorone	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2-Nitrophenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2,4-Dimethylphenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Bis(2-chloroethoxy)methane	9.6	UJ,H	9.6

TABLE A-1

## Analytical Results SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Matrix	Parameter	Chemical	Result	URS Qual. Code	RL
SAS046	OSAA-1-66	Groundwater	SVOCs	2,4-Dichlorophenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	1,2,4-Trichlorobenzene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Naphthalene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	4-Chloroaniline	19	UJ,H	19
SAS046	OSAA-1-66	Groundwater	SVOCs	Hexachlorobutadiene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	4-Chloro-3-methylphenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2-Methylnaphthalene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Hexachlorocyclopentadiene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2,4,6-Trichlorophenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2,4,5-Trichlorophenol	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2-Chlorophthalene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-66	Groundwater	SVOCs	Dimethyl phthalate	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Acenaphthylene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	3-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-66	Groundwater	SVOCs	Acenaphthene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2,4-Dinitrophenol	48	UJ,H	48
SAS046	OSAA-1-66	Groundwater	SVOCs	4-Nitrophenol	48	UJ,H	48
SAS046	OSAA-1-66	Groundwater	SVOCs	Dibenzofuran	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2,4-Dinitrotoluene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	2,6-Dinitrotoluene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Diethyl phthalate	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	4-Chlorophenyl phenyl ether	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Fluorene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	4-Nitroaniline	48	UJ,H	48
SAS046	OSAA-1-66	Groundwater	SVOCs	4,6-Dinitro-2-methylphenol	48	UJ,H	48
SAS046	OSAA-1-66	Groundwater	SVOCs	N-Nitrosodiphenylamine	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	4-Bromophenyl phenyl ether	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Hexachlorobenzene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Pentachlorophenol	48	UJ,H	48
SAS046	OSAA-1-66	Groundwater	SVOCs	Phenanthrene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Anthracene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Di-n-butyl phthalate	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Fluoranthene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Pyrene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Butyl benzyl phthalate	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	3,3'-Dichlorobenzidine	19	UJ,H	19
SAS046	OSAA-1-66	Groundwater	SVOCs	Benzo[a]anthracene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Bis(2-ethylhexyl) phthalate	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Chrysene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Di-n-octyl phthalate	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Benzo[b]fluoranthene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Benzo[k]fluoranthene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Benzo[a]pyrene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Indeno[1,2,3-cd]pyrene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Dibenz[a,h]anthracene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Benzo[g,h,i]perylene	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Carbazole	9.6	UJ,H	9.6
SAS046	OSAA-1-66	Groundwater	SVOCs	Dinoseb	9.6	UJ,H	9.6
SAS046	UAA-11-22	Groundwater	SVOCs	Phenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Bis(2-chloroethyl) ether	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2-Chlorophenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	1,3-Dichlorobenzene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	1,4-Dichlorobenzene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	1,2-Dichlorobenzene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2-Methylphenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	3 & 4 Methylphenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	N-Nitrosodi-n-propylamine	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Hexachloroethane	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Nitrobenzene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Isophorone	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2-Nitrophenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2,4-Dimethylphenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Bis(2-chloroethoxy)methane	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2,4-Dichlorophenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	1,2,4-Trichlorobenzene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Naphthalene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	4-Chloroaniline	19	UJ,S	19
SAS046	UAA-11-22	Groundwater	SVOCs	Hexachlorobutadiene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	4-Chloro-3-methylphenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2-Methylnaphthalene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Hexachlorocyclopentadiene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2,4,6-Trichlorophenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2,4,5-Trichlorophenol	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2-Chlorophthalene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2-Nitroaniline	48	UJ,S	48
SAS046	UAA-11-22	Groundwater	SVOCs	Dimethyl phthalate	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Acenaphthylene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	3-Nitroaniline	48	UJ,S	48
SAS046	UAA-11-22	Groundwater	SVOCs	Acenaphthene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2,4-Dinitrophenol	48	UJ,S	48

TABLE A-1

## Analytical Results SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Matrix	Parameter	Chemical	Result	URS Qual. Code	RL
SAS046	UAA-11-22	Groundwater	SVOCs	4-Nitrophenol	48	UJ,S	48
SAS046	UAA-11-22	Groundwater	SVOCs	Dibenzofuran	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2,4-Dinitrotoluene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	2,6-Dinitrotoluene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Diethyl phthalate	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	4-Chlorophenyl phenyl ether	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Fluorene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	4-Nitroaniline	48	UJ,S	48
SAS046	UAA-11-22	Groundwater	SVOCs	4,6-Dinitro-2-methylphenol	48	UJ,S	48
SAS046	UAA-11-22	Groundwater	SVOCs	N-Nitrosodiphenylamine	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	4-Bromophenyl phenyl ether	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Hexachlorobenzene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Pentachlorophenol	48	UJ,S	48
SAS046	UAA-11-22	Groundwater	SVOCs	Phenanthrene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Anthracene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Di-n-butyl phthalate	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Fluoranthene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Pyrene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Butyl benzyl phthalate	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	3,3'-Dichlorobenzidine	19	UJ,S	19
SAS046	UAA-11-22	Groundwater	SVOCs	Benzo[a]anthracene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Bis(2-ethylhexyl) phthalate	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Chrysene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Di-n-octyl phthalate	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Benzo[b]fluoranthene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Benzo[k]fluoranthene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Benzo[a]pyrene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Indeno[1,2,3-cd]pyrene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Dibenzo[a,h]anthracene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Benzo[g,h,i]perylene	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Carbazole	9.5	UJ,S	9.5
SAS046	UAA-11-22	Groundwater	SVOCs	Dinoseb	9.5	UJ,S	9.5
SAS046	UAA-11-102	Groundwater	SVOCs	1,4-Dichlorobenzene	40	J,S	9.4
SAS046	AA-P-10-42	Groundwater	Herbicides	Pentachlorophenol	0.24	R,m	0.24
SAS046	OSAA-1-46	Groundwater	Metals	Beryllium	0.00057	U,o	0.004
SAS046	OSAA-1-86	Groundwater	Metals	Beryllium	0.00039	U,o	0.004
SAS046	OSAA-1-106	Groundwater	Metals	Beryllium	0.00028	U,o	0.004
SAS046	AA-P-10-62	Groundwater	Metals	Beryllium	0.00041	U,o	0.004
SAS046	AA-P-10-82	Groundwater	Metals	Beryllium	0.00082	U,o	0.004
SAS046	AA-P-10-102	Groundwater	Metals	Beryllium	0.00048	U,o	0.004
SAS046	AA-10-102-D	Groundwater	Metals	Beryllium	0.00039	U,o	0.004
SAS046	AA-P-10-118.5	Groundwater	Metals	Beryllium	0.00049	U,o	0.004
SAS046	OSAA-1-26	Groundwater	Metals	Barium	0.6	J,n	0.01
SAS046	OSAA-1-26	Groundwater	Metals	Chromium	0.045	J,n	0.01
SAS046	OSAA-1-26	Groundwater	Metals	Manganese	2.5	J,n	0.01
SAS046	OSAA-1-26	Groundwater	Metals	Vanadium	0.078	J,n	0.01
SAS046	OSAA-1-26	Groundwater	Metals	Zinc	0.31	J,n	0.02
SAS046	OSAA-1-46	Groundwater	Metals	Barium	0.36	J,n	0.01
SAS046	OSAA-1-46	Groundwater	Metals	Chromium	0.067	J,n	0.01
SAS046	OSAA-1-46	Groundwater	Metals	Manganese	1.9	J,n	0.01
SAS046	OSAA-1-46	Groundwater	Metals	Vanadium	0.023	J,n	0.01
SAS046	OSAA-1-46	Groundwater	Metals	Zinc	0.69	J,n	0.02
SAS046	OSAA-1-66	Groundwater	Metals	Barium	0.88	J,n	0.01
SAS046	OSAA-1-66	Groundwater	Metals	Chromium	0.27	J,n	0.01
SAS046	OSAA-1-66	Groundwater	Metals	Manganese	2	J,n	0.01
SAS046	OSAA-1-66	Groundwater	Metals	Vanadium	0.067	J,n	0.01
SAS046	OSAA-1-66	Groundwater	Metals	Zinc	2	J,n	0.02
SAS046	OSAA-1-86	Groundwater	Metals	Barium	0.36	J,n	0.01
SAS046	OSAA-1-86	Groundwater	Metals	Chromium	0.095	J,n	0.01
SAS046	OSAA-1-86	Groundwater	Metals	Manganese	1	J,n	0.01
SAS046	OSAA-1-86	Groundwater	Metals	Vanadium	0.016	J,n	0.01
SAS046	OSAA-1-86	Groundwater	Metals	Zinc	1.8	J,n	0.02
SAS046	OSAA-1-106	Groundwater	Metals	Barium	0.18	J,n	0.01
SAS046	OSAA-1-106	Groundwater	Metals	Chromium	0.051	J,n	0.01
SAS046	OSAA-1-106	Groundwater	Metals	Manganese	0.89	J,n	0.01
SAS046	OSAA-1-106	Groundwater	Metals	Vanadium	0.0095	J,n	0.01
SAS046	OSAA-1-106	Groundwater	Metals	Zinc	0.56	J,n	0.02
SAS046	UAA-11-22	Groundwater	Metals	Barium	0.54	J,n	0.01
SAS046	UAA-11-22	Groundwater	Metals	Chromium	0.17	J,n	0.01
SAS046	UAA-11-22	Groundwater	Metals	Manganese	2	J,n	0.01
SAS046	UAA-11-22	Groundwater	Metals	Vanadium	0.036	J,n	0.01
SAS046	UAA-11-22	Groundwater	Metals	Zinc	0.2	J,n	0.02
SAS046	UAA-11-42	Groundwater	Metals	Barium	0.32	J,n	0.01
SAS046	UAA-11-42	Groundwater	Metals	Chromium	0.052	J,n	0.01
SAS046	UAA-11-42	Groundwater	Metals	Manganese	5	J,n	0.01
SAS046	UAA-11-42	Groundwater	Metals	Vanadium	0.015	J,n	0.01
SAS046	UAA-11-42	Groundwater	Metals	Zinc	0.22	J,n	0.02
SAS046	UAA-11-62	Groundwater	Metals	Barium	0.27	J,n	0.01
SAS046	UAA-11-62	Groundwater	Metals	Chromium	0.13	J,n	0.01
SAS046	UAA-11-62	Groundwater	Metals	Manganese	12	J,n	0.01
SAS046	UAA-11-62	Groundwater	Metals	Vanadium	0.016	J,n	0.01

TABLE A-1

## Analytical Results SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Matrix	Parameter	Chemical	Result	URS Qual. Code	RL
SAS046	UAA-11-62	Groundwater	Metals	Zinc	0.49	J,n	0.02
SAS046	UAA-11-62-D	Groundwater	Metals	Barium	0.23	J,n	0.01
SAS046	UAA-11-62-D	Groundwater	Metals	Chromium	0.099	J,n	0.01
SAS046	UAA-11-62-D	Groundwater	Metals	Manganese	12	J,n	0.01
SAS046	UAA-11-62-D	Groundwater	Metals	Vanadium	0.011	J,n	0.01
SAS046	UAA-11-62-D	Groundwater	Metals	Zinc	0.4	J,n	0.02
SAS046	UAA-11-82	Groundwater	Metals	Barium	0.19	J,n	0.01
SAS046	UAA-11-82	Groundwater	Metals	Chromium	0.091	J,n	0.01
SAS046	UAA-11-82	Groundwater	Metals	Manganese	13	J,n	0.01
SAS046	UAA-11-82	Groundwater	Metals	Vanadium	0.0099	J,n	0.01
SAS046	UAA-11-82	Groundwater	Metals	Zinc	0.41	J,n	0.02
SAS046	UAA-11-102	Groundwater	Metals	Barium	0.37	J,n	0.01
SAS046	UAA-11-102	Groundwater	Metals	Chromium	0.24	J,n	0.01
SAS046	UAA-11-102	Groundwater	Metals	Manganese	6.7	J,n	0.01
SAS046	UAA-11-102	Groundwater	Metals	Vanadium	0.017	J,n	0.01
SAS046	UAA-11-102	Groundwater	Metals	Zinc	23	J,n	0.02
SAS046	AA-P-10-22	Groundwater	Metals	Barium	0.18	J,n	0.01
SAS046	AA-P-10-22	Groundwater	Metals	Chromium	0.014	J,n	0.01
SAS046	AA-P-10-22	Groundwater	Metals	Manganese	0.17	J,n	0.01
SAS046	AA-P-10-22	Groundwater	Metals	Vanadium	0.0087	J,n	0.01
SAS046	AA-P-10-22	Groundwater	Metals	Zinc	0.036	J,n	0.02
SAS046	AA-P-10-42	Groundwater	Metals	Barium	0.27	J,n	0.01
SAS046	AA-P-10-42	Groundwater	Metals	Chromium	0.064	J,n	0.01
SAS046	AA-P-10-42	Groundwater	Metals	Manganese	2.7	J,n	0.01
SAS046	AA-P-10-42	Groundwater	Metals	Vanadium	0.017	J,n	0.01
SAS046	AA-P-10-42	Groundwater	Metals	Zinc	0.26	J,n	0.02
SAS046	AA-P-10-62	Groundwater	Metals	Barium	0.26	J,n	0.01
SAS046	AA-P-10-62	Groundwater	Metals	Chromium	0.087	J,n	0.01
SAS046	AA-P-10-62	Groundwater	Metals	Manganese	2.7	J,n	0.01
SAS046	AA-P-10-62	Groundwater	Metals	Vanadium	0.013	J,n	0.01
SAS046	AA-P-10-62	Groundwater	Metals	Zinc	0.4	J,n	0.02
SAS046	AA-P-10-82	Groundwater	Metals	Barium	0.38	J,n	0.01
SAS046	AA-P-10-82	Groundwater	Metals	Chromium	0.11	J,n	0.01
SAS046	AA-P-10-82	Groundwater	Metals	Manganese	2.7	J,n	0.01
SAS046	AA-P-10-82	Groundwater	Metals	Vanadium	0.032	J,n	0.01
SAS046	AA-P-10-82	Groundwater	Metals	Zinc	0.54	J,n	0.02
SAS046	AA-P-10-102	Groundwater	Metals	Barium	0.24	J,n	0.01
SAS046	AA-P-10-102	Groundwater	Metals	Chromium	0.056	J,n	0.01
SAS046	AA-P-10-102	Groundwater	Metals	Manganese	4.3	J,n	0.01
SAS046	AA-P-10-102	Groundwater	Metals	Vanadium	0.02	J,n	0.01
SAS046	AA-P-10-102	Groundwater	Metals	Zinc	0.38	J,n	0.02
SAS046	AA-P-10-102-D	Groundwater	Metals	Barium	0.18	J,n	0.01
SAS046	AA-P-10-102-D	Groundwater	Metals	Chromium	0.048	J,n	0.01
SAS046	AA-P-10-102-D	Groundwater	Metals	Manganese	3.6	J,n	0.01
SAS046	AA-P-10-102-D	Groundwater	Metals	Vanadium	0.014	J,n	0.01
SAS046	AA-P-10-102-D	Groundwater	Metals	Zinc	0.46	J,n	0.02
SAS046	AA-P-10-118.5	Groundwater	Metals	Barium	0.38	J,n	0.01
SAS046	AA-P-10-118.5	Groundwater	Metals	Chromium	0.25	J,n	0.01
SAS046	AA-P-10-118.5	Groundwater	Metals	Manganese	9.7	J,n	0.01
SAS046	AA-P-10-118.5	Groundwater	Metals	Vanadium	0.015	J,n	0.01
SAS046	AA-P-10-118.5	Groundwater	Metals	Zinc	3.1	J,n	0.02
SAS046	AA-P-10-42	Groundwater	Metals	Aluminum	8.9	J,k	0.2
SAS046	AA-P-10-42	Groundwater	Metals	Potassium	14	J,m	1
SAS047	SA2-MW-1-D	Groundwater	VOCs	Acetone	25	UJ,C	25
SAS047	SA2-MW-1-D	Groundwater	VOCs	2-Butanone	10	UJ,C	10
SAS047	SA2-MW-1-D	Groundwater	SVOCs	3-Nitroaniline	47	UJ,L	47
SAS047	SA2-MW-1-D	Groundwater	SVOCs	3,3'-Dichlorobenzidine	19	RL	19
SAS047	SA2-MW-1-D	Groundwater	Metals	Chromium	0.0042	U,o	0.01
SAS047	SA2-MW-1-D	Groundwater	Metals	Copper	0.0034	U,o	0.02
SAS047	SA2-MW-1-D	Groundwater	Metals	Lead	0.005	U,o	0.005
SAS047	SA2-MW-1-D	Groundwater	Metals	Potassium	29	J,s	1
SAS047	SA2-MW-1-D	Groundwater	Wet chemistry	Nitrate	0.5	UJ,h	0.5
SAS047	SA2-MW-1-D	Groundwater	Wet chemistry	Nitrite	0.5	R,h	0.5
SAS048	SA2-MW-4-D	Groundwater	VOCs	2-Butanone	200	UJ,C	200
SAS048	SA2-MW-1-M	Groundwater	VOCs	2-Butanone	10	UJ,C	10
SAS048	SA2-MW-1-M-D	Groundwater	VOCs	2-Butanone	10	UJ,C	10
SAS048	SA2-MW-1-S	Groundwater	VOCs	2-Butanone	10	UJ,C	10
SAS048	SA2-MW-2-M	Groundwater	VOCs	2-Butanone	10	UJ,C	10
SAS048	SA2-MW-2-D	Groundwater	VOCs	Bromomethane	2	UJ,C	2
SAS048	SA2-MW-2-D	Groundwater	VOCs	2-Butanone	20	UJ,C	20
SAS048	SA2-MW-2-D	Groundwater	VOCs	4-Methyl-2-Pentanone	20	UJ,C	20
SAS048	SA2-MW-2-S	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS048	SA2-MW-2-S	Groundwater	VOCs	2-Butanone	10	UJ,C	10
SAS048	SA2-MW-2-S	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-8-D	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS048	SA2-MW-8-D	Groundwater	VOCs	2-Butanone	10	UJ,C	10
SAS048	SA2-MW-8-D	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-4-M	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS048	SA2-MW-4-M	Groundwater	VOCs	2-Butanone	10	UJ,C	10
SAS048	SA2-MW-4-M	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-4-S	Groundwater	VOCs	2-Butanone	50	UJ,C	50

TABLE A-1

## Analytical Results SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Matrix	Parameter	Chemical	Result	URS Qual. Code	RL
SAS048	SA2-MW-4-S	Groundwater	VOCs	4-Methyl-2-Pentanone	500	UJ,C	500
SAS048	SA2-MW-4-S	Groundwater	VOCs	Bromomethane	500	UJ,C	500
SAS048	SA2-MW-3-M	Groundwater	VOCs	2-Butnaone	1	UJ,C	1
SAS048	SA2-MW-3-M	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-3-M	Groundwater	VOCs	Bromomethane	10	UJ,C	10
SAS048	SA2-MW-3-S	Groundwater	VOCs	2-Butnaone	1	UJ,C	1
SAS048	SA2-MW-3-S	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-3-S	Groundwater	VOCs	Bromomethane	10	UJ,C	10
SAS048	SA2-MW-3-S-D	Groundwater	VOCs	2-Butnaone	1	UJ,C	1
SAS048	SA2-MW-3-S-D	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-3-S-D	Groundwater	VOCs	Bromomethane	10	UJ,C	10
SAS048	SA2-MW-3-D	Groundwater	VOCs	2-Butnaone	1	UJ,C	1
SAS048	SA2-MW-3-D	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-3-D	Groundwater	VOCs	Bromomethane	10	UJ,C	10
SAS048	SA2-MW-10M	Groundwater	VOCs	2-Butnaone	5	UJ,C	5
SAS048	SA2-MW-10M	Groundwater	VOCs	4-Methyl-2-Pentanone	50	UJ,C	50
SAS048	SA2-MW-10M	Groundwater	VOCs	Bromomethane	50	UJ,C	50
SAS048	SA2-MW-10D	Groundwater	VOCs	2-Butnaone	1	UJ,C	1
SAS048	SA2-MW-10D	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-10D	Groundwater	VOCs	Bromomethane	10	UJ,C	10
SAS048	SA2-MW-10S	Groundwater	VOCs	2-Butnaone	10	UJ,C	10
SAS048	SA2-MW-10S	Groundwater	VOCs	4-Methyl-2-Pentanone	10	UJ,C	10
SAS048	SA2-MW-4-D	Groundwater	Pesticides	alpha-BHC	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	beta-BHC	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	delta-BHC	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	gamma-BHC (Lindane)	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Heptachlor	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Aldrin	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Heptachlor epoxide	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Endosulfan I	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Dieldrin	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	4,4'-DDE	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Endrin	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Endrin aldehyde	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Endosulfan II	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	4,4'-DDD	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Endosulfan sulfate	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	4,4'-DDT	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Endrin ketone	0.095	UJ,s	0.095
SAS048	SA2-MW-4-D	Groundwater	Pesticides	Methoxychlor	0.48	UJ,s	0.48
SAS048	SA2-MW-4-D	Groundwater	Pesticides	alpha-Chlordane	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	Pesticides	gamma-Chlordane	0.048	UJ,s	0.048
SAS048	SA2-MW-4-D	Groundwater	PCBs	Monochlorobiphenyl	0.094	UJ,l	0.094
SAS048	SA2-MW-4-D	Groundwater	PCBs	Dichlorobiphenyl	0.094	UJ,l	0.094
SAS048	SA2-MW-4-D	Groundwater	PCBs	Trichlorobiphenyl	0.094	UJ,l	0.094
SAS048	SA2-MW-4-D	Groundwater	PCBs	Tetrachlorobiphenyl	0.19	UJ,l	0.19
SAS048	SA2-MW-4-D	Groundwater	PCBs	Pentachlorobiphenyl	0.19	UJ,l	0.19
SAS048	SA2-MW-4-D	Groundwater	PCBs	Hexachlorobiphenyl	0.19	UJ,l	0.19
SAS048	SA2-MW-4-D	Groundwater	PCBs	Heptachlorobiphenyl	0.28	UJ,l	0.28
SAS048	SA2-MW-4-D	Groundwater	PCBs	Octachlorobiphenyl	0.28	UJ,l	0.28
SAS048	SA2-MW-4-D	Groundwater	PCBs	Nonachlorobiphenyl	0.47	UJ,l	0.47
SAS048	SA2-MW-4-D	Groundwater	PCBs	DCB Decachlorobiphenyl	0.47	UJ,l	0.47
SAS048	SA2-MW-1-M	Groundwater	Metals	Chromium	0.0017	U,o	0.01
SAS048	SA2-MW-1-M-D	Groundwater	Metals	Chromium	0.0018	U,o	0.01
SAS048	SA2-MW-1-S	Groundwater	Metals	Copper	0.003	U,o	0.02
SAS048	SA2-MW-2-M	Groundwater	Metals	Chromium	0.0015	U,o	0.01
SAS048	SA2-MW-2-S	Groundwater	Metals	Chromium	0.00086	U,o	0.01
SAS048	SA2-MW-2-S	Groundwater	Metals	Copper	0.0042	U,o	0.02
SAS048	SA2-MW-8-D	Groundwater	Metals	Chromium	0.0023	U,o	0.01
SAS048	SA2-MW-4-M	Groundwater	Metals	Chromium	0.0061	U,o	0.01
SAS048	SA2-MW-4-S	Groundwater	Metals	Chromium	0.0013	U,o	0.01
SAS048	SA2-MW-3-M	Groundwater	Metals	Chromium	0.0017	U,o	0.01
SAS048	SA2-MW-3-S	Groundwater	Metals	Chromium	0.0015	U,o	0.01
SAS048	SA2-MW-3-S	Groundwater	Metals	Copper	0.0058	U,o	0.01
SAS048	SA2-MW-3-S-D	Groundwater	Metals	Chromium	0.0011	U,o	0.01
SAS048	SA2-MW-3-S-D	Groundwater	Metals	Copper	0.0058	U,o	0.02
SAS048	SA2-MW-10M	Groundwater	Metals	Chromium	0.00094	U,o	0.01
SAS048	SA2-MW-10D	Groundwater	Metals	Chromium	0.0015	U,o	0.01
SAS048	SA2-MW-10S	Groundwater	Metals	Copper	0.0042	U,o	0.02
SAS048	SA2-MW-10S	Groundwater	Metals	Chromium	0.0017	U,o	0.01
SAS048	SA2-MW-10S	Groundwater	Herbicides	Pentachlorophenol	0.24	R,m	0.24
SAS048	SA2-MW-3-M	Groundwater	Wet chemistry	Total Organic Carbon	1.5	U,x	1
SAS049	SA2-MW-9-S	Groundwater	VOCs	Carbon disulfide	1.8	J,L	2
SAS049	SA2-MW-6-M	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-6-M-Dup	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-6-D	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-9-D	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-9-D-D	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-9-M	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-9-S	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-5-D	Groundwater	VOCs	Bromomethane	1	UJ,C	1

TABLE A-1

## Analytical Results SDGs SAS044 - SAS049 and G6G070273

SDG	Sample ID	Matrix	Parameter	Chemical	Result	URS Qual. Code	RL
SAS049	SA2-MW-5-S	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-5-M	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-7-M	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-7-D	Groundwater	VOCs	Bromomethane	1	UJ,C	1
SAS049	SA2-MW-6-D	Groundwater	Metals	Aluminum	0.16	U,o	0.2
SAS049	SA2-MW-9-D	Groundwater	Metals	Aluminum	0.034	U,o	0.02
SAS049	SA2-MW-9-D-D	Groundwater	Metals	Aluminum	0.035	U,o	0.2
SAS049	SA2-MW-5-D	Groundwater	Metals	Aluminum	0.038	U,o	0.2









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## CHAIN OF CUSTODY RECORD

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QUOTE #

**SEVERN TRENT LABORATORIES, INC.**

Customer Information		Project Information		Analysis/Methods	
PO:		Project Name:	SA2 <del>SA2</del> <u>Phase 2/3</u>	A	VOC(8260) 3-40ml.Clr-MeOH/Nabisulf.
WO:		Project Number:		B	SVOC/Herb 1-500ml.Clr-NoPres
Company:	URS CORPORATION	Bill To:	SA2 <u>SG</u>	C	VOC(8260) 1-2oz.Clr-NoPres
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	Ammonia/Metals 1-8oz.HPDE-NoPres
Address:	SUITE 300	Address:		E	TCLP <sup>1</sup> 1-500ml.Clr-NoPres
	ST. LOUIS MO 63110			F	TCLP VOC 1-4oz.Clr-NoPres
E-mail:				G	PEST/PCB 1-500ml.Clr-NoPres
Phone:	314-429-0100	Phone:		H	
Fax:	314-429-0562	Fax:		I	
				J	

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	SOIL-Q-21-SS-0.5	SEE ANALYSIS/METHODS	5-3-06	1340	--	SOIL		X	X	X	X											
2	SOIL-Q-21-38-4'	SEE ANALYSIS/METHODS	5-3-06	1400	--	SOIL		X	X	X	X											
3	TR-1	SEE ANALYSIS/METHODS			--	SOIL		X														
4		SEE ANALYSIS/METHODS			--	SOIL																
5		SEE ANALYSIS/METHODS			--	SOIL																
6		SEE ANALYSIS/METHODS			--	SOIL																
7		SEE ANALYSIS/METHODS			--	SOIL																
8		SEE ANALYSIS/METHODS			--	SOIL																
9		SEE ANALYSIS/METHODS			--	SOIL																
10		SEE ANALYSIS/METHODS			--	SOIL																

Sampler: <u>Brandi Higgins</u>		Shipment Method: <u>Fed-X</u>		Date Due (fax):	
1. Relinquished by: <u>Ed Hill</u>	Date: <u>5-3-06</u>	2. Received by: <u>KL</u>	Date: <u>5/4/06</u>	3. Relinquished by:	Date:
Company: <u>URS</u>	Time: <u>1800</u>	Company: <u>STC Savannah</u>	Time: <u>1045</u>	Company:	Time:

Comments: 1 - For TCLP Analysis, see special instructions previously supplied

Standard turn

Rush turn

Severn Trent Laboratories, Inc.

5102 LaRoche Avenue

Project Manager:

Savannah

**TEMP: 0.6**

68° - 16250

Phone: 912-354-7858

Fax: 912-351-3673

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CHAIN OF CUSTODY RECORD

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QUOTE #

SEVERN TRENT LABORATORIES, INC.

Customer Information		Project Information		Analysis/Methods	
PO:		Project Name:	SAZ Supplemental Investigation	A	VOC(8260) 3-40ml.Clr-MeOH/Nabisulf.
WO:		Project Number:		B	SVOC/Herb 1-500ml.Clr-NoPres Herb not REC
Company:	URS CORPORATION	Bill To:		C	VOC(8260) 1-2oz.Clr-NoPres Der Brandi Higgs
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	Ammonia/Metals 1-8oz.HPDE-NoPres 12/5/96
Address:	SUITE 300	Address:		E	TCLP 1-500ml.Clr-NoPres
	ST. LOUIS MO 63110			F	TCLP VOC 1-4oz.Clr-NoPres
E-mail:				G	PEST/PCB 1-500ml.Clr-NoPres
Phone:	314-429-0100	Phone:		H	TOC
Fax:	314-429-0562	Fax:		I	
				J	

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	NAPL-C-31'	SEE ANALYSIS/METHODS	5-8-06	1050	---	SOIL		X	X						X							
2	NAPL-C-139'	SEE ANALYSIS/METHODS	5-8-06	1420	---	SOIL		X	X						X							
3	TB-2	SEE ANALYSIS/METHODS			---	SOIL		X														
4		SEE ANALYSIS/METHODS			---	SOIL																
5		SEE ANALYSIS/METHODS			---	SOIL																
6		SEE ANALYSIS/METHODS			---	SOIL																
7		SEE ANALYSIS/METHODS			---	SOIL																
8		SEE ANALYSIS/METHODS			---	SOIL																
9		SEE ANALYSIS/METHODS			---	SOIL																
10		SEE ANALYSIS/METHODS			---	SOIL																

Sampler: Brandi Higgs		Shipment Method:		Date Due (fax):	
1. Relinquished by:	Date:	2. Received by:	Date:	3. Relinquished by:	Date:
Brandi Higgs	5-8-06	Jeff Clarke	05-08-06	Jeff Clarke	050806
Company:	Time:	Company:	Time:	Company:	Time:
URS	1525	STL	1525	STL	1700
4. Received by:	Date:	5. Relinquished by:	Date:	6. Received by:	Date:
Brandi Higgs	5/9/06	Brandi Higgs	5/9/06	Brandi Higgs	5/9/06
Company:	Time:	Company:	Time:	Company:	Time:
STL/SAV	855	STL/SAV	855	STL/SAV	855

Comments: 1 - For TCLP Analysis, see special instructions previously supplied

Standard turn ☒ Other ☐

Rush turn ☐

TEMP.: 24

Severn Trent Laboratories, Inc.

5102 LaRoche Avenue

Savannah GA

Phone: 912-354-7858

Fax: 912-351-3873

Project Manager:

680-16419

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TRENT

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CHAIN OF CUSTODY RECORD

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QUOTE #

SEVERN TRENT LABORATORIES, INC.

Customer Information		Project Information		Analysis Methods	
PO:		Project Name:	SA2 Supplemental Investigation	A	VOC(8260) 3-40ml. Clr-MeOH/Nabisulf.
WO:		Project Number:	Phase 2/3	B	SVOC(8260) 1-500ml. Clr-NoPres
Company:	URS CORPORATION	Bill To:		C	VOC(8260) 1-2oz. Clr-NoPres
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	Ammonia/Metals 1-8oz. HPDE-NoPres
Address:	SUITE 300	Address:		E	TCLP <sup>1</sup> 1-500ml. Clr-NoPres
	ST. LOUIS MO 63110			F	TCLP VOC 1-4oz. Clr-NoPres
E-mail:				G	PEST/PCB 1-500ml. Clr-NoPres
Phone:	314-429-0100	Phone:		H	TCC
Fax:	314-429-0562	Fax:		I	
				J	

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	NAPL-B-34	SEE ANALYSIS/METHODS	5-9-06	1230	---	SOIL		X	X						X							
2	NAPL-B-139	SEE ANALYSIS/METHODS	5-9-06	1510	---	SOIL		X	X						X							
3	TB-3	SEE ANALYSIS/METHODS			---	SOIL		X														
4		SEE ANALYSIS/METHODS			---	SOIL																
5		SEE ANALYSIS/METHODS			---	SOIL																
6		SEE ANALYSIS/METHODS			---	SOIL																
7		SEE ANALYSIS/METHODS			---	SOIL																
8		SEE ANALYSIS/METHODS			---	SOIL																
9		SEE ANALYSIS/METHODS			---	SOIL																
10		SEE ANALYSIS/METHODS			---	SOIL																

Sampler: Branch Higgins		Shipment Method:		Date Due (fax):	
1. Relinquished by:	Date: 5-10-06	2. Received by:	Date: 5/10/06	3. Relinquished by:	Date: 05/10/06
Company: URS	Time: 0730	Company: STL - STL	Time: 0730	Company: STL St. Louis	Time: 1800
4. Received by:	Date:	5. Received by:	Date:	6. Received by:	Date:

Comments: 1 - For TCLP Analysis, see special instructions previously supplied

Standard turn ☒ Other ☐

Rush turn ☐

Severn Trent Laboratories, Inc.

5102 LaRoche Avenue

Project Manager:

Savannah, GA

TEMP. 4/6

Phone: 912-354-7858

680-16525  
16419

Fax: 912-351-3673



# STL

## CHAIN OF CUSTODY RECORD

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QUOTE #

**SEVERN TRENT LABORATORIES, INC.**

Customer Information		Project Information		Analysis/Methods	
PO:		Project Name:	SA2 Site Remediation	A	VOC(8260) 3-40ml.Clr-MeOH/Nabisulf.
WO:		Project Number:	Phase 2/3	B	SVOC(8260) 1-500ml.Clr-NoPres
Company:	URS CORPORATION	Bill To:		C	VOC(8260) 1-2oz.Clr-NoPres
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	Ammonia/Metals 1-8oz.HPDE-NoPres
Address:	SUITE 300	Address:		E	TCLP 1-500ml.Clr-NoPres
	ST. LOUIS MO 63110			F	TCLP VOC 1-4oz.Clr-NoPres
E-mail:				G	PEST/PCB 1-500ml.Clr-NoPres
Phone:	314-429-0100	Phone:		H	70C
Fax:	314-429-0562	Fax:		I	
				J	

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	NAPEL-A-40	SEE ANALYSIS/METHODS	5-10-06	1140	---	SOIL		X	X							X						
2	NAPEL-A-138	SEE ANALYSIS/METHODS	5-10-06	1210	---	SOIL		X	X							X						
3	TR4	SEE ANALYSIS/METHODS			---	SOIL		X														
4		SEE ANALYSIS/METHODS			---	SOIL																
5		SEE ANALYSIS/METHODS			---	SOIL																
6		SEE ANALYSIS/METHODS			---	SOIL																
7		SEE ANALYSIS/METHODS			---	SOIL																
8		SEE ANALYSIS/METHODS			---	SOIL																
9		SEE ANALYSIS/METHODS			---	SOIL																
10		SEE ANALYSIS/METHODS			---	SOIL																

Sampler: Brandi Higgins 80 5/10/06 Shipment Method: Date Due (fax):

1. Relinquished by:	Date:	2. Received by:	Date:	3. Relinquished by:	Date:	4. Received by:	Date:
<i>[Signature]</i>	5/10/06	<i>[Signature]</i>	5/11/06	<i>[Signature]</i>	05/11/06	<i>[Signature]</i>	5/12/06
Company: URS	Time: 0715	Company: STL-SR	Time: 0715	Company: STL-SR	Time: 1830	Company: STLSAN	Time: 0924

Comments: 1 - For TCLP Analysis, see special instructions previously supplied

Standard turn 680-16419 Other \_\_\_\_\_

Rush turn \_\_\_\_\_

Severn Trent Laboratories, Inc.

5102 LaRoche Avenue

Savannah GA

Phone: 912-354-7858

Fax: 912-351-3873

Project Manager:



# STL

## CHAIN OF CUSTODY RECORD

1.1°C

Page 1 of 2

QUOTE #

SEVERN TRENT LABORATORIES, INC.

Customer Information		Project Information		Analysis/Methods	
PO:		Project Name:	SA2 Supplemental Investigation	A	VOC(8260) 3-40ml.Clr-MeOH/Nabjsulf
WO:		Project Number:	21561683 - Phase 2/3	B	SVOC/Herb 1-500ml.Clr-NoPres
Company:	URS CORPORATION	Bill To:		C	VOC(8260) 1-2oz.Clr-NoPres
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	Ammonia/Metals 1-8oz.HPDE-NoPres
Address:	SUITE 300	Address:		E	TCLP <sup>1</sup> 1-500ml.Clr-NoPres
	ST. LOUIS MO 63110			F	TCLP VOC 1-4oz.Clr-NoPres
E-mail:				G	PEST/PCB 1-500ml.Clr-NoPres
Phone:	314-429-0100	Phone:		H	TOC
Fax:	314-429-0562	Fax:		J	

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	NAPL-A-(75-80')	SEE ANALYSIS/METHODS	5/19/06	18:30	---	SOIL	1								X							
2	NAPL-A-(95-100')	SEE ANALYSIS/METHODS	5/19/06	09:30	---	SOIL	1								X							
3	NAPL-A-(105-110')	SEE ANALYSIS/METHODS	5/19/06	10:30	---	SOIL	1								X							
4	NAPL-B-(20-25')	SEE ANALYSIS/METHODS	5/16/06	08:30	---	SOIL	1								X							
5	NAPL-B-(80-85')	SEE ANALYSIS/METHODS	5/16/06	10:03	---	SOIL	1								X							
6	NAPL-B-(110-115')	SEE ANALYSIS/METHODS	5/16/06	10:35	---	SOIL	1								X							
7	NAPL-B-138-MS/MSD	SEE ANALYSIS/METHODS	5/16/06	11:20	---	SOIL	3		X													
8	NAPL-B-138-MS/MSD	SEE ANALYSIS/METHODS	5/16/06	11:20	---	SOIL	2								X							
9	NAPL-B-138-MS/MSD	SEE ANALYSIS/METHODS	5/16/06	11:30	---	SOIL	2		X	X												
10	NAPL-B-138-MS/MSD	SEE ANALYSIS/METHODS	5/16/06	11:30	---	SOIL	2x3		X													

Sampler: Jennifer KUPCEK Shipment Method: Date Due (fax):

1. Relinquished by:	Date:	2. Received by:	Date:	3. Relinquished by:	Date:	4. Received by:	Date:
<i>[Signature]</i>	5/18/06	<i>[Signature]</i>	5/18/06	<i>[Signature]</i>	5/18/06	<i>[Signature]</i>	5/18/06
Company: JCS	Time: 07:40	Company: TWI-LITE EXP	Time: 07:40	Company: TWI-LITE EXP	Time: 08:45	Company: SR-SR	Time: 08:45

Comments: 1 - For TCLP Analysis, see special instructions previously supplied

DATE	TIME	TEMP.
5/19/06	09:08	4.3

Standard turn \_\_\_\_\_ Other \_\_\_\_\_  
Rush turn \_\_\_\_\_

Severn Trent Laboratories, Inc.

5102 LaRoche Avenue

Savannah GA

Phone: 912-354-7858 680 16 925

Fax: 912-351-3873

Project Manager:

Relinquished by: S-RIP 5/19/06 09:08  
REC: *[Signature]* 5/23/2006 1600

REC: *[Signature]* STL 5/19/2006 1000  
REC:



# STL

## CHAIN OF CUSTODY RECORD

1.1°C

Page: 2 of 2

QUOTE #

**SEVERN TRENT LABORATORIES, INC.**

Customer Information		Project Information		Analysis Methods	
PO:		Project Name:	SA2 Supplemental Investigation	A	VOC(8260) 3-40ml.Clr-MeOH/Nabsulf.
WO:		Project Number:	21561683-Pho 213	B	SVOC/Herb 1-500ml.Clr-NoPres
Company:	URS CORPORATION	Bill To:		C	VOC(8260) 1-2oz.Clr-NoPres
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	Ammonia/Metals 1-8oz.HPDE-NoPres
Address:	SUITE 300	Address:		E	TCLP <sup>1</sup> 1-500ml.Clr-NoPres
	ST. LOUIS MO 63110			F	TCLP VOC 1-4oz.Clr-NoPres
E-mail:				G	PEST/PCB 1-500ml.Clr-NoPres
Phone:	314-429-0100	Phone:		H	TOL
Fax:	314-429-0562	Fax:		I	
				J	

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	NAPL-C-31-D	SEE ANALYSIS/METHODS	5-17-06	09:10	---	SOIL	1		X													
2	NAPL-C-31-D	SEE ANALYSIS/METHODS	5-17-06	09:10	---	SOIL	1		X													
3	NAPL-C-31-D	SEE ANALYSIS/METHODS	5-17-06	09:10	---	SOIL	1								X							
4	NAPL-C-31-D	SEE ANALYSIS/METHODS	5-17-06	09:10	---	SOIL	3		X													
5	NAPL-C-(20-25)	SEE ANALYSIS/METHODS	5-17-06	08:47	---	SOIL	1								X							
6	NAPL-C-(10570)	SEE ANALYSIS/METHODS	5-17-06	10:30	---	SOIL	1								X							
7	NAPL-C-(100-105)	SEE ANALYSIS/METHODS	5-17-06	11:15	---	SOIL	1								X							
8	TR-4	SEE ANALYSIS/METHODS			---	SOIL			X													
9		SEE ANALYSIS/METHODS			---	SOIL																
10		SEE ANALYSIS/METHODS			---	SOIL																

Sampler: Jennifer Kypa		Shipment Method:		Date Due (fax):	
1. Relinquished by:	Date: 5-18-06	2. Received by:	Date: 5/18/06	3. Relinquished by:	Date: 5/18/06
Company: URS	Time: 0740	Company: TULLITE EXP	Time: 07:40	Company: TULLITE EXP	Time: 07:45

Comments: 1 - For TCLP Analysis, see special instructions previously supplied		Standard turn		Other	
		670-16925			
		Rush turn			

Severn Trent Laboratories, Inc.

5102 LaRoche Avenue

Savannah GA

Phone: 912-354-7858

Fax: 912-351-3873

Project Manager:

Relinquished by: B-LP 05/18/06 1800  
REL: Data Manager 5/23/2006 1000

REC: [Signature] 5/18/2006 1000  
REC:

SEVERN  
TRENT

STL

CHAIN OF CUSTODY RECORD

Page: 1 of 1

QUOTE #

SEVERN TRENT LABORATORIES, INC.

Customer Information		Project Information		Analysis Methods	
PO:		Project Name:	SA2 Supplemental Investigation	A	VOC (8260) 4-40ml. Clr-HCl
WO:		Project Number:	21561683	B	SVOC (8270) 2L-Amb-NoPres
Company:	URS CORPORATION	Bill To:		C	Metals (6010/7470) 1-500ml. HPDE-HN03
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	Ammonia 1-250ml. HPDE-H2S04
Address:	SUITE 300	Address:		E	Herbicides 1L-Amb-NoPres
	ST. LOUIS MO 63110			F	Pesticides 1L-Amb-NoPres
E-mail:				G	PCBs 1L-Amb-NoPres
Phone:	314-429-0100	Phone:		H	MNA
Fax:	314-429-0562	Fax:		I	Other:
				J	

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	OSAA-1-26	SEE ANALYSIS/METHODS	6-2-06	0850	---	Water		X	X	X	X											
2	OSAA-1-46	SEE ANALYSIS/METHODS	6-2-06	0950	---	Water		X	X	X	X											
3	OSAA-1-66	SEE ANALYSIS/METHODS	6-2-06	1100	---	Water		X	X	X	X											
4	OSAA-1-86	SEE ANALYSIS/METHODS	6-2-06	1203	---	Water		X	X	X	X											
5	TB-6	SEE ANALYSIS/METHODS	6-2-06		---	Water		X														
6	OSAA-1-106	SEE ANALYSIS/METHODS	6-2-06	1410	---	Water		X	X	X	X											
7		SEE ANALYSIS/METHODS			---	Water																
8		SEE ANALYSIS/METHODS			---	Water																
9		SEE ANALYSIS/METHODS			---	Water																
10		SEE ANALYSIS/METHODS			---	Water																

Sampler: Jennifer Kypka		Shipment Method:		Date Due (fax):	
1. Relinquished by:	Date:	2. Received by:	Date:	3. Relinquished by:	Date:
Jennifer K. Kypka	6-2-06	[Signature]	6-2-06	[Signature]	6/2/06
Company:	Time:	Company:	Time:	Company:	Time:
URS	16:15	TWILITE EXPRESS	16:15	TWILITE EXP	16:52
Comments: 1 - For MNA Analysis, see special instructions previously supplied					
Relg: Phil Miller 0602-06 1800					
Standard turn					
Rush turn 670-17250					

Severn Trent Laboratories, Inc.

5102 LaRoche Avenue

Savannah GA

Phone: 912-354-7858

912-351-3673

Project Manager:

RECEIVED  
060306 0901

TEMP. 5.0/3.2

SEVERN  
TRENT

STL

CHAIN OF CUSTODY RECORD

QUOTE #

SEVERN TRENT LABORATORIES, INC.

Customer Information		Project Information		Analysis/Methods	
PO:		Project Name:	SA2 Supplemental Investigation	A	VOC(8260) 4-40ml.Cl <sub>2</sub> -HCl
WO:		Project Number:	Phase 2 & 3	B	SVOC (8270) 2L-Amb-NoPres
Company:	URS CORPORATION	Bill To:		C	Metals (6010/7470) 1-500ml.HPDE-HNO <sub>3</sub>
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	Ammonia 1-250ml.HPDE-H <sub>2</sub> SO <sub>4</sub>
Address:	SUITE 300	Address:		E	Herbicides 1L-Amb-NoPres
	ST. LOUIS MO 63110			F	Pesticides 1L-Amb-NoPres
E-mail:				G	PCBs 1L-Amb-NoPres
Phone:	314-429-0100	Phone:		H	MNA
Fax:	314-429-0562	Fax:		I	
				J	Other:

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	OSAA-2-22 UAA-11-22	SEE ANALYSIS/METHODS	6-5-06	0950	---	Water	10	X	X	X	X	X										
2	OSAA- UAA-11-48	SEE ANALYSIS/METHODS	6-5-06	1115	---	Water	10	X	X	X	X	X										
3	UAA-11-62	SEE ANALYSIS/METHODS	6-5-06	1315	---	Water	10	X	X	X	X	X										
4	UAA-11-62-D	SEE ANALYSIS/METHODS	6-5-06	1315	---	Water	10	X	X	X	X	X										
5	TB-7	SEE ANALYSIS/METHODS			---	Water	4															
6	UAA-11-82	SEE ANALYSIS/METHODS	6-5-06	1445	---	Water	10	X	X	X	X	X										
7	UAA-11-102	SEE ANALYSIS/METHODS	6-5-06	1610	---	Water	10	X	X	X	X	X										
8		SEE ANALYSIS/METHODS			---	Water																
9		SEE ANALYSIS/METHODS			---	Water																
10		SEE ANALYSIS/METHODS			---	Water																

Sampler: IRK		Shipment Method:		Date Due (fax):	
1. Relinquished by:	Date:	2. Received by:	Date:	3. Relinquished by:	Date:
Sennel Kuyata	6/6/06	[Signature]	6/6/06	[Signature]	6/6/06
Company:	Time:	Company:	Time:	Company:	Time:
URS	07:30	TRU-LITE EXP.	9:15	TRU-LITE EXP.	09:50

Comments: 1 - For MNA Analysis, see special instructions previously supplied	3.8/4.0/9.1 TEMP.	Standard turn	Other
Relinqu: Phil Miller 060606 1050		Rush turn	

Savenn Trent Laboratories, Inc.

5102 LaRoche Avenue

Project Manager:

Savannah GA

Phone: 912-354-7858

912-351-3573

680-17250



Serial Number 51308

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

☐ STL Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404

 Website: www.stl-inc.com  
 Phone: (912) 354-7858  
 Fax: (912) 352-0165

☐ Alternate Laboratory Name/Location

 Phone:  
 Fax:

PROJECT REFERENCE		PROJECT NO. SA-Phase 2+3	PROJECT LOCATION (STATE) IL	MATRIX TYPE	REQUIRED ANALYSIS										PAGE	OF
STL (LAB) PROJECT MANAGER		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT...)	HEV	VOC (8260) #102	SVOC (8260) #102	Hebicide 2L Aduer	Metals (1001/1470)	1-2500 (1-HANE)	Monitors (1-2500)	Other	STANDARD REPORT DELIVERY <input type="radio"/>			
CLIENT (SITE) PM		CLIENT PHONE 314-429-0100	CLIENT FAX 314-429-0500		no	no	no	no	no	no	no	no	DATE DUE			
CLIENT NAME URS-STL		CLIENT E-MAIL			DATE DUE EXPEDITED REPORT DELIVERY (SURCHARGE) <input type="radio"/>											
CLIENT ADDRESS 1001 Highlands Plaza Drive West St 300 St. Louis, MO 63110					DATE DUE NUMBER OF COOLERS SUBMITTED PER SHIPMENT: 5											
COMPANY CONTRACTING THIS WORK (if applicable)																
SAMPLE		SAMPLE IDENTIFICATION			NUMBER OF CONTAINERS SUBMITTED										REMARKS	
DATE	TIME															
6/6/06	1020	AA-P-10-22			X	X	X	X	X	X	X	X	X			
6/6/06	1130	AA-P-10-42			X	X	X	X	X	X	X	X	X			
6/6/06	1130	AA-P-10-42 - MS/MSD			X	X	X	X	X	X	X	X	X			
6/6/06	1405	AA-P-10-62			X	X	X	X	X	X	X	X	X			
6/6/06	1510	TB-8			X											
6/6/06	1510	AA-P-10-82			X	X	X	X	X	X	X	X	X			
6/7/06	0840	AA-P-10-102			X	X	X	X	X	X	X	X	X			
6/7/06	0840	AA-P-10-102-D			X	X	X	X	X	X	X	X	X			
6/7/06	1045	AA-P-10-118.5			X	X	X	X	X	X	X	X	X			
RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i> DATE 6-7-06 TIME 12:20 RECEIVED BY: (SIGNATURE) <i>[Signature]</i> DATE 6/7/06 TIME 12:20 RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i> DATE 6/7/06 TIME 13:05 RECEIVED BY: (SIGNATURE) <i>[Signature]</i> DATE 6/7/06 TIME 13:05																
RECEIVED FOR LABORATORY USE: (SIGNATURE) <i>[Signature]</i> DATE 6/8/06 TIME 12:50																

TEMP: 2.0/0.1/0.3


STL8240-680 (12)

Serial Number 51322

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

# STL

 **STL Savannah**  
5102 LaRoche Avenue  
Savannah, GA 31404

Website: [www.sti-inc.com](http://www.sti-inc.com)  
Phone: (912) 354-7858  
Fax: (912) 352-0165

☐ Alternate Laboratory Name/Location

Phone:  
Fax:

[illegible]

STL8240-680 (12/02)

### ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

# STL

**STL Savannah**  
5102 LaRoche Avenue  
Savannah, GA 31404

Website: [www.stl-inc.com](http://www.stl-inc.com)  
Phone: (912) 354-7858  
Fax: (912) 352-0165

☐ Alternate Laboratory Name/Location

Phone:  
Fax:

[illegible]

Serial Number 51328

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

☒ STL Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404

 Website: www.stl-inc.com  
Phone: (912) 354-7858  
Fax: (912) 352-0165

☐ Alternate Laboratory Name/Location

 Phone:  
Fax:

PROJECT REFERENCE <b>Solutia Area 2</b>		PROJECT NO. <b>21561683</b>	PROJECT LOCATION (STATE) <b>IL</b>	MATRIX TYPE	REQUIRED ANALYSIS												PAGE <b>1</b>	OF <b>1</b>
STL (LAB) PROJECT MANAGER <b>Lydia Guilia</b>		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	HCl	VOCs-9260B	SVOCs-9270C	HERB-8151A	Metals, Manganese	Ammonia-350.1	Nitrate, Nitrite	Nitrate, Nitrite	Methane, Ethane, Ethene	Sulfate, Chloride	Carbon Dioxide, Alkalinity	HCl TOC	STANDARD REPORT DELIVERY <input checked="" type="checkbox"/>	
CLIENT (SITE) PM <b>Bob Billman</b>		CLIENT PHONE <b>314-429-0100</b>	CLIENT FAX <b>314-429-0962</b>														DATE DUE	
CLIENT NAME <b>URS Corporation</b>		CLIENT E-MAIL															EXPEDITED REPORT DELIVERY (SURCHARGE) <input type="checkbox"/>	
CLIENT ADDRESS <b>1001 Highlands Plaza Drive W. Ste. 300 St. Louis, MO 63110</b>		COMPANY CONTRACTING THIS WORK (if applicable)															DATE DUE	
SAMPLE		SAMPLE IDENTIFICATION			NUMBER OF CONTAINERS SUBMITTED												REMARKS	
DATE	TIME																	
7/5/06	0940	SAB-MW-1-M			X		3	2	2	1	1	1	1	3	1	1	1	
	0740	SA2-MW-1-M-D			X		3	2	2	1	1	1	1	3	1	1	1	
	1155	SA2-MW-1-S			X		3	2	2	1	1	1	1	3	1	1	1	
		Frip TB-10			X		X											
	1510	SA2-MW-2-M			X		3	2	2	1	1	1	1	3	1	1	1	
IMP. 5.8/4.0 / 2.9																		
RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>		DATE 7-5-06	TIME 1740	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>		DATE 7/5/06	TIME 18:15	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>		DATE 07-05-06	TIME 1845							
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		DATE 7/5/06	TIME 17:40	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		DATE 7/5/06	TIME 18:15	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		DATE	TIME							
LABORATORY USE ONLY																		
RECEIVED FOR LABORATORY BY: (SIGNATURE) <i>[Signature]</i>		DATE 070606	TIME 0916	CUSTODY INTACT YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	CUSTODY SEAL NO. 680-18156	STL SAVANNAH LOG NO.		LABORATORY REMARKS										

Serial Number 51329

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

STL Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404Website: www.stl-inc.com  
Phone: (912) 354-7858  
Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE <b>Solutia Area 2</b>		PROJECT NO. <b>21561683</b>	PROJECT LOCATION (STATE) <b>IL</b>	MATRIX TYPE	REQUIRED ANALYSIS												PAGE <b>1</b>	OF <b>1</b>
STL (LAB) PROJECT MANAGER <b>Lydia Guilizia</b>		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	HCl	VOCs - 8260B	SVOCs - 8260C	Herbicides - 8151A	Metals, Manganese	H <sub>2</sub> SO <sub>4</sub> Ammonia - 350.1	None Nitrate/Nitrite	H <sub>2</sub> SO <sub>4</sub> Nitrate/Nitrite	Methanol, Ethanol, Ethene	Sulfate, Chloride	Carbon Dioxide/Alkalinity	HCl TOC	STANDARD REPORT DELIVERY	
CLIENT (SITE) PM <b>Bob Sullivan Veenstra</b>		CLIENT PHONE <b>314-429-0100</b>	CLIENT FAX <b>314-429-0462</b>														DATE DUE	
CLIENT NAME <b>URS Corporation</b>		CLIENT E-MAIL															EXPEDITED REPORT DELIVERY (SURCHARGE)	
CLIENT ADDRESS <b>1001 Highlands Plaza Dr. West Ste. 300 St. Louis, MO 63110</b>																	DATE DUE	
COMPANY CONTRACTING THIS WORK (if applicable)																	NUMBER OF COOLERS SUBMITTED PER SHIPMENT:	
SAMPLE		SAMPLE IDENTIFICATION			NUMBER OF CONTAINERS SUBMITTED												REMARKS	
DATE	TIME																	
7/6/06		TB-11			X	X												
	1005	SA2-MW-2-D			X	3	2	2	1	1	1	1	3	1	1	1		
	1005	SA2-MW-2-D-MS			X	3	2	2	1	1	1	1	3	1	1	1		
	1005	SA2-MW-2-D-MSD			X	3	2	2	1	1	1	1	3	1	1	1		
	1330	SA2-MW-2-S			X	3	2	2	1	1	1	1	3	1	1	1		
✓	1600	SA2-MW-8-D			X	3	2	2	1	1	1	1	3	1	1	1		
MEC																		
RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		
						7/6/06	1715			7/6/06	1715			7/6/06	1715			
RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		
						7/6/06	1715			7/6/06	1715			7/6/06	1715			
RECEIVED FOR: (SIGNATURE)		DATE	TIME	CUSTODY INTACT		CUSTODY SEAL NO.		STL SAVANNAH LOG NO.		LABORATORY REMARKS								
		07/06/06	0910	YES				087113156										

STL8240-680 (12/02)

Serial Number 5131U

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

STL Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404Website: www.stl-inc.com  
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Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE <b>SA 2 - Phase 2/3</b>		PROJECT NO. <b>21561683</b>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS												PAGE <b>1</b> OF <b>1</b>
STL (LAB) PROJECT MANAGER		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	HCl	VOCs	SVOCs	HERB	Metals	Pesticides	PCBs	Carbon Dioxide	Alkalinity	TOC	STANDARD REPORT DELIVERY		
CLIENT (SITE) PM <b>Bob Vanstra</b>		CLIENT PHONE	CLIENT FAX												DATE DUE		
CLIENT NAME <b>URS Corp.</b>		CLIENT E-MAIL													EXPEDITED REPORT DELIVERY (SURCHARGE)		
CLIENT ADDRESS <b>1001 Highlands Plaza Dr. W. St. Louis MO 63110</b>		COMPANY CONTRACTING THIS WORK (if applicable)													DATE DUE		
SAMPLE		SAMPLE IDENTIFICATION												NUMBER OF CONTAINERS SUBMITTED		REMARKS	
DATE	TIME																
7-6-06	0945	SA2-mw-4-m												3 2 2 1 1 1 1 3 1 1 1 4			
7-6-06	1345	SA2-mw-4-S												3 2 2 1 1 1 1 3 1 1 1 4			
7-6-06	1550	SA2-mw-3m-FB												3 2 2 1 1			
7-6-06	1535	SA2-mw-10m-FB												3 2 2 1 1			
															TEMP. <b>5.9/1.6/2.6</b>		
															<b>2.2</b>		
RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME		
RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME		
RECEIVED FOR LABORATORY BY: (SIGNATURE)		DATE	TIME	CUSTODY INTACT		STL SAVANNAH LOG NO.		LABORATORY REMARKS									
		07/06/06	0900	YES <input type="radio"/> NO <input type="radio"/>		6080-18156											

STL8240-680 (12/02)

Serial Number 51330

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

STL Savannah  
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Savannah, GA 31404Website: www.stl-inc.com  
Phone: (912) 354-7858  
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Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE <b>Solutia Area 2</b>		PROJECT NO. <b>21561683</b>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS												PAGE <b>1</b>	OF <b>1</b>	
STL (LAB) PROJECT MANAGER <b>Lydia Guilizia</b>		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	HCl	VOCs - 8260B	SVOCS - 8270C	Halides - 8161A	Metals, Manganese	Ammonia - 350.1	Nitrate/Nitrite	Nitrate/Nitrite	Methane, Ethane, Ethanol	Sulfate, Chloride	Carbon Dioxide/ Alkalinity	TOC	STANDARD REPORT DELIVERY <input checked="" type="checkbox"/>	DATE DUE	
CLIENT (SITE) PM <b>Bob Veunstra</b>		CLIENT PHONE	CLIENT FAX		none	none	none	none	none	none	none	none	none	none	none	none	none	EXPEDITED REPORT DELIVERY (SURCHARGE) <input type="checkbox"/>	DATE DUE
CLIENT NAME <b>URS Corporation</b>		CLIENT E-MAIL			none	none	none	none	none	none	none	none	none	none	none	none	none	NUMBER OF COOLERS SUBMITTED PER SHIPMENT:	
CLIENT ADDRESS <b>1001 Highlands Plaza Dr. W. Ste. 300 St. Louis, MO 63110</b>		COMPANY CONTRACTING THIS WORK (if applicable)																	
SAMPLE		SAMPLE IDENTIFICATION			NUMBER OF CONTAINERS SUBMITTED												REMARKS		
DATE	TIME																		
7/7/06	0855	SA2-MW-3-M			X	3	2	2	1	1	1	1	1	1	1	1			
	1110	SA2-MW-3-S			X	3	2	2	1	1	1	1	1	1	1	1			
	1110	SA2-MW-3-S-D			X	3	2	2	1	1	1	1	1	1	1	1			
✓	1415	SA2-MW-3-D			X	3	2	2	1	1	1	1	1	1	1	1			
MEC																			
TEMP.: 2.2/2.6/1.6/1.4																			
RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME
						7/7/06	1515			7/7/06	1515			7/7/06	1515			7/7/06	1515
RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME
						7/7/06	1515			7/7/06	1515			7/7/06	1515			7/7/06	1515
LABORATORY USE ONLY:																			
RECEIVED FOR LABORATORY BY: (SIGNATURE)		DATE	TIME	CUSTODY INTACT YES <input type="checkbox"/> NO <input type="checkbox"/>		CUSTODY SEAL NO.		STL SAVANNAH LOG NO.		LABORATORY REMARKS									
KL		7/8/06	0838					680-18156											

STL8240-680 (12/02)

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

# STL

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5102 LaRoche Avenue  
Savannah, GA 31404

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☐ Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE		PROJECT NO.		PROJECT LOCATION (STATE)		MATERIAL TYPE		REQUIRED ANALYSIS										PAGE	OF
STL (LAB) PROJECT MANAGER		P.O. NUMBER		CONTRACT NO.												STANDARD REPORT DELIVERY			
CLIENT (SITE) PM		CLIENT PHONE		CLIENT FAX												DATE DUE			
CLIENT NAME		CLIENT E-MAIL														EXPEDITED REPORT DELIVERY (SURCHARGE)			
CLIENT ADDRESS																DATE DUE			
COMPANY CONTRACTING THIS WORK (if applicable)																NUMBER OF COOLERS SUBMITTED PER SHIPMENT:			
SAMPLE IDENTIFICATION						NUMBER OF CONTAINERS SUBMITTED										REMARKS			
DATE	TIME																		
7-7-06	0900	SAZ-mw-10m				X													
7-7-06	0920	SAZ-MW-10D				X		3	2	2	1	1	1	3	1	1	1		
7-7-06	1120	SAZ-MW-10-S				X		3	2	2	1	1	1	3	1	1	1		
7-7-06	1120	SAZ-MW-10-S-MIS				X		3	2	2	1	1	1	3	1	1	1		
7-7-06	1100	SAZ-MW-10-S-MSD				X		3	2	2	1	1	1	3	1	1	1		
7-7-06		TB - 12				X		X											
TEMP.: 2.2/2.6/1.6/1.4																			
RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)			
						7/7/06	1515			7/7/06	1554			7/7/06	1554				
RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)			
						7/7/06	1515			7/7/06	1554			7/7/06	1554				
LABORATORY USE ONLY																			
RECEIVED FOR LABORATORY BY: (SIGNATURE)		DATE	TIME	CUSTODY INTACT YES NO	CUSTODY SEAL NO	STL SAVANNAH LOG NO	LABORATORY REMARKS												
		7/8/06	0838	YES NO		688-18156													



Serial Number 51332

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

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5102 LaRoche Avenue  
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Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE <b>SA2</b>		PROJECT NO. <b>21561683</b>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS												PAGE <b>1</b>	OF <b>1</b>
STL (LAB) PROJECT MANAGER <b>Linda Gurliza</b>		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	TOC-880ab	DVC-880ac	H. Chlorides-850d	Metals, Nonpne	As, Pb, Ammonia-350.1	Nitrate, Nitrite	Nitrate, Nitrite	Ammonia, Phos, Silica	Sulfate, Chloride	Carbonates/Alkalinity	STANDARD REPORT DELIVERY	DATE DUE		
CLIENT (SITE) PM <b>Bob Verstra</b>		CLIENT PHONE <b>314-429-0100</b>	CLIENT FAX <b>314-429-0462</b>		TOC	EXPEDITED REPORT DELIVERY (SURCHARGE)	DATE DUE											
CLIENT NAME <b>URS Corp.</b>		CLIENT E-MAIL			HC	NUMBER OF COOLERS SUBMITTED PER SHIPMENT:												
CLIENT ADDRESS <b>100 Highlands Plaza Dr. St. Louis, MO 63110</b>		COMPANY CONTRACTING THIS WORK (if applicable)			REMARKS													
SAMPLE		SAMPLE IDENTIFICATION			NUMBER OF CONTAINERS SUBMITTED													
DATE	TIME																	
7-10-06		TB-13			X													
7-10-06	1030	SA2-MW-6-M			X	3	2	2	1	1	1	3	1	1	1			
7-10-06	1030	SA2-MW-6-M-Dup			X	3	2	2	1	1	1	3	1	1	1			
7-10-06	1500	SA2-MW-6-D			X	3	2	2	1	1	1	3	1	1	1			
RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME									
<i>[Signature]</i>		7/10/06	17:00	<i>[Signature]</i>	7/10/06	17:45	<i>[Signature]</i>	7/10/06	17:45									
RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME									
<i>[Signature]</i>		7/10/06	17:00	<i>[Signature]</i>	7/10/06	17:45	<i>[Signature]</i>	7/10/06	17:45									
RECEIVED FOR LABORATORY (SIGNATURE)		DATE	TIME	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS											
<i>[Signature]</i>		07/10/06	0906	YES <input type="radio"/> NO <input type="radio"/>		68048	18316											

STL8240-680 (12/02)

Serial Number 51337

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

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○ Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE		PROJECT NO.	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS														PAGE	OF					
Solutia Area 2		21561683	IL																1	1					
STL (LAB) PROJECT MANAGER		P.O. NUMBER	CONTRACT NO.																STANDARD REPORT DELIVERY						
Lydia Guilizia																			DATE DUE						
CLIENT (SITE) PM		CLIENT PHONE	CLIENT FAX																EXPEDITED REPORT DELIVERY (SURCHARGE)						
Bob Veenstra		314-429-0100	314-429-0462																DATE DUE						
CLIENT NAME		CLIENT E-MAIL																	NUMBER OF COOLERS SUBMITTED PER SHIPMENT:						
URS Corporation																									
CLIENT ADDRESS																									
1001 Highlands Plaza Dr. W. Ste. 300 St. Louis, MO 63110																									
COMPANY CONTRACTING THIS WORK (if applicable)																									
SAMPLE		SAMPLE IDENTIFICATION		COMPOSITE (C) OR GRAB (G) INDICATE		AQUEOUS (WATER)		SOLID OR SEMISOLID		AIR		NONAQUEOUS LIQUID (OIL, SOLVENT, ...)		NUMBER OF CONTAINERS SUBMITTED										REMARKS	
DATE	TIME																								
7/10/06	0950	SA2-MW-9-D		X										3	2	2	1	1	1	3	1	1	1		
	0950	SA2-MW-9-D-D		X										3	2	2	1	1	1	3	1	1	1		
	1430	SA2-MW-9-M		X										3	2	2	1	1	1	3	1	1	1		
	1540	SA2-MW-9-S		X										3	1	-	-	-	-	3	-	-	-		
MEC																									
RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME						
[Signature]		7/10/06	17:00	[Signature]		7/10/06	17:45	[Signature]		7/10/06	17:45	[Signature]		07/10/06	18:05	[Signature]		07/10/06	18:05						
RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME						
[Signature]		7/10/06	17:00	[Signature]		7/10/06	17:45	[Signature]		7/10/06	17:45	[Signature]		07/10/06	18:05	[Signature]		07/10/06	18:05						
LABORATORY USE ONLY																									
RECEIVED FOR LABORATORY BY: (SIGNATURE)		DATE	TIME	CUSTODY INTACT		CUSTODY SEAL NO.		STL SAVANNAH LOG NO.		LABORATORY REMARKS															
[Signature]		07/10/06	0906	YES ○ NO ○				60018316																	

STL8240-680 (12/02)

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

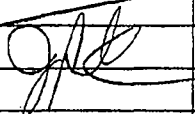
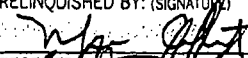
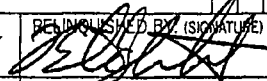
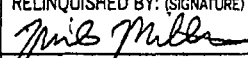
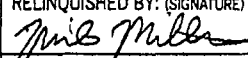

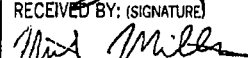
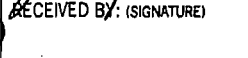
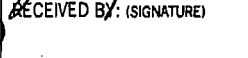
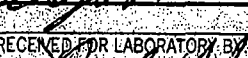
# STL

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☐ Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE		PROJECT NO.		PROJECT LOCATION (STATE)		MATRIX TYPE		REQUIRED ANALYSIS										PAGE	OF						
SA-2		21561683		IL																					
STL (LAB) PROJECT MANAGER		P.O. NUMBER		CONTRACT NO.														STANDARD REPORT DELIVERY							
Lydia Guilizzia																		DATE DUE							
CLIENT (SITE) PM		CLIENT PHONE		CLIENT FAX														EXPEDITED REPORT DELIVERY (SURCHARGE)							
Bob Veenstra		314-489-0100		314-489-0462														DATE DUE							
CLIENT NAME		CLIENT E-MAIL																NUMBER OF COOLERS SUBMITTED PER SHIPMENT:							
URS Corp.																									
CLIENT ADDRESS																									
1001 Highland Plaza Dr. W. St 300 St. Louis, MO 63110																									
COMPANY CONTRACTING THIS WORK (if applicable)																									
SAMPLE		SAMPLE IDENTIFICATION		COMPOSITE (C) OR GRAB (G) INDICATE		AQUEOUS (WATER)		SOLID OR SEMISOLID		AIR		NON-AQUEOUS LIQUID (OIL, SOLVENT,...)		NUMBER OF CONTAINERS SUBMITTED										REMARKS	
DATE	TIME																								
7-11-06	1030	SA2-MW-5-D		X										3 2 2 1 1 1 1 3 1 1 1											
7-11-06	1232	SA2-MW-5-S		X										3 2 2 1 1 1 1 3 1 1 1											
7-11-06	1530	SA2-MW-5-M		X										3 2 2 1 1 1 1 3 1 1 1											
7-11-06		TB-14		X										3 - - - - - - - - - - - - - - -											
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RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RELINQUISHED BY: (SIGNATURE)		DATE	TIME										
		7/11/06	17:15			7/11/06	18:00			07/11/06	1830														
RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)		DATE	TIME										
		7/11/06	17:15			7/11/06	18:00																		
RECEIVED FOR LABORATORY BY (SIGNATURE)		DATE	TIME	CUSTODY INTACT YES	CUSTODY SEAL NO	STL SAVANNAH LOG NO	LABORATORY REMARKS																		
		07/11/06	0905	YES	NO	603018316																			

Serial Number 51338

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

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Fax:

PROJECT REFERENCE <b>Solutia Area 2</b>		PROJECT NO. <b>21561683</b>	PROJECT LOCATION (STATE) <b>IL</b>	MATRIX TYPE	REQUIRED ANALYSIS												PAGE <b>1</b>	OF <b>1</b>
STL (LAB) PROJECT MANAGER <b>Lydia Guilizia</b>		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	HCl	none	SVOCs-8270C	Herbicides-8151A	Metals, Manganese	Ammonia-350.1	Nitrate, Nitrite	Nitrate, Nitrite, Methane, Ethane	Ethene	Sulfate, Chloride	Carbon Dioxide, Alkalinity	TDC	STANDARD REPORT DELIVERY <b>1</b>	
CLIENT (SITE) PM <b>Bob Veenstra</b>		CLIENT PHONE <b>314-429-0100</b>	CLIENT FAX <b>314-429-0162</b>														DATE DUE	
CLIENT NAME <b>URS Corporation</b>		CLIENT E-MAIL															EXPEDITED REPORT DELIVERY (SURCHARGE) <b>0</b>	
CLIENT ADDRESS <b>1001 Highlands Plaza Dr. W. Ste. 300 St. Louis, MO 63110</b>		COMPANY CONTRACTING THIS WORK (if applicable)															DATE DUE	
SAMPLE		SAMPLE IDENTIFICATION			NUMBER OF CONTAINERS SUBMITTED												REMARKS	
DATE	TIME																	
7/11/06	0930	SA2-MW-9-S			X	-	1*	2	-	-	-	-	-	-	-	-		
	1125	SA2-MW-7-M-FB			X	3	2	2	1	1	1	3	1	1	1			
	1435	SA2-MW-7-M			X	3	2	2	1	1	1	3	1	1	1			
	1600	SA2-MW-7-D			X	3	2	2	1	1	1	3	1	1	1			
7/11/06		TB-15 (Received w/ samples) L. Guilizia 7/12/06			X	✓												
MEC																		
RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>		DATE 7/11/06	TIME 17:15	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>		DATE 7/11/06	TIME 18:00	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>		DATE 07/11/06	TIME 1830							
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		DATE 7/11/06	TIME 17:15	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		DATE 7/11/06	TIME 18:00	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>		DATE	TIME							
RECEIVED FOR LABORATORY BY: (SIGNATURE) <i>[Signature]</i>		DATE 07/12/06	TIME 0905	CUSTODY INTACT YES <input type="radio"/> NO <input type="radio"/>	CUSTODY SEAL NO.	STL SAVANNAH LOG NO. 68018316	LABORATORY REMARKS: * Analyze for Herbicide only. See SVOC analysis for PCBs. 18316-8 / Sampled 8/10; Received 7/14/06. (8) 8/10/06											

STL8240-680 (12/02)

Serial Number 51336

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

STL Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404Website: www.stl-inc.com  
Phone: (912) 354-7858  
Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE <b>SA2</b>		PROJECT NO. <b>21561683</b>	PROJECT LOCATION (STATE)	MATRIX TYPE	REQUIRED ANALYSIS										PAGE	OF																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
STL (LAB) PROJECT MANAGER <b>Lydia Guiriz</b>		P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT, ...)	H2O3	H2O4	H2O5	H2O6	H2O7	H2O8	H2O9	H2O10	H2O11	H2O12	H2O13	H2O14	H2O15	H2O16	H2O17	H2O18	H2O19	H2O20	H2O21	H2O22	H2O23	H2O24	H2O25	H2O26	H2O27	H2O28	H2O29	H2O30	H2O31	H2O32	H2O33	H2O34	H2O35	H2O36	H2O37	H2O38	H2O39	H2O40	H2O41	H2O42	H2O43	H2O44	H2O45	H2O46	H2O47	H2O48	H2O49	H2O50	H2O51	H2O52	H2O53	H2O54	H2O55	H2O56	H2O57	H2O58	H2O59	H2O60	H2O61	H2O62	H2O63	H2O64	H2O65	H2O66	H2O67	H2O68	H2O69	H2O70	H2O71	H2O72	H2O73	H2O74	H2O75	H2O76	H2O77	H2O78	H2O79	H2O80	H2O81	H2O82	H2O83	H2O84	H2O85	H2O86	H2O87	H2O88	H2O89	H2O90	H2O91	H2O92	H2O93	H2O94	H2O95	H2O96	H2O97	H2O98	H2O99	H2O100	H2O101	H2O102	H2O103	H2O104	H2O105	H2O106	H2O107	H2O108	H2O109	H2O110	H2O111	H2O112	H2O113	H2O114	H2O115	H2O116	H2O117	H2O118	H2O119	H2O120	H2O121	H2O122	H2O123	H2O124	H2O125	H2O126	H2O127	H2O128	H2O129	H2O130	H2O131	H2O132	H2O133	H2O134	H2O135	H2O136	H2O137	H2O138	H2O139	H2O140	H2O141	H2O142	H2O143	H2O144	H2O145	H2O146	H2O147	H2O148	H2O149	H2O150	H2O151	H2O152	H2O153	H2O154	H2O155	H2O156	H2O157	H2O158	H2O159	H2O160	H2O161	H2O162	H2O163	H2O164	H2O165	H2O166	H2O167	H2O168	H2O169	H2O170	H2O171	H2O172	H2O173	H2O174	H2O175	H2O176	H2O177	H2O178	H2O179	H2O180	H2O181	H2O182	H2O183	H2O184	H2O185	H2O186	H2O187	H2O188	H2O189	H2O190	H2O191	H2O192	H2O193	H2O194	H2O195	H2O196	H2O197	H2O198	H2O199	H2O200	H2O201	H2O202	H2O203	H2O204	H2O205	H2O206	H2O207	H2O208	H2O209	H2O210	H2O211	H2O212	H2O213	H2O214	H2O215	H2O216	H2O217	H2O218	H2O219	H2O220	H2O221	H2O222	H2O223	H2O224	H2O225	H2O226	H2O227	H2O228	H2O229	H2O230	H2O231	H2O232	H2O233	H2O234	H2O235	H2O236	H2O237	H2O238	H2O239	H2O240	H2O241	H2O242	H2O243	H2O244	H2O245	H2O246	H2O247	H2O248	H2O249	H2O250	H2O251	H2O252	H2O253	H2O254	H2O255	H2O256	H2O257	H2O258	H2O259	H2O260	H2O261	H2O262	H2O263	H2O264	H2O265	H2O266	H2O267	H2O268	H2O269	H2O270	H2O271	H2O272	H2O273	H2O274	H2O275	H2O276	H2O277	H2O278	H2O279	H2O280	H2O281	H2O282	H2O283	H2O284	H2O285	H2O286	H2O287	H2O288	H2O289	H2O290	H2O291	H2O292	H2O293	H2O294	H2O295	H2O296	H2O297	H2O298	H2O299	H2O300	H2O301	H2O302	H2O303	H2O304	H2O305	H2O306	H2O307	H2O308	H2O309	H2O310	H2O311	H2O312	H2O313	H2O314	H2O315	H2O316	H2O317	H2O318	H2O319	H2O320	H2O321	H2O322	H2O323	H2O324	H2O325	H2O326	H2O327	H2O328	H2O329	H2O330	H2O331	H2O332	H2O333	H2O334	H2O335	H2O336	H2O337	H2O338	H2O339	H2O340	H2O341	H2O342	H2O343	H2O344	H2O345	H2O346	H2O347	H2O348	H2O349	H2O350	H2O351	H2O352	H2O353	H2O354	H2O355	H2O356	H2O357	H2O358	H2O359	H2O360	H2O361	H2O362	H2O363	H2O364	H2O365	H2O366	H2O367	H2O368	H2O369	H2O370	H2O371	H2O372	H2O373	H2O374	H2O375	H2O376	H2O377	H2O378	H2O379	H2O380	H2O381	H2O382	H2O383	H2O384	H2O385	H2O386	H2O387	H2O388	H2O389	H2O390	H2O391	H2O392	H2O393	H2O394	H2O395	H2O396	H2O397	H2O398	H2O399	H2O400	H2O401	H2O402	H2O403	H2O404	H2O405	H2O406	H2O407	H2O408	H2O409	H2O410	H2O411	H2O412	H2O413	H2O414	H2O415	H2O416	H2O417	H2O418	H2O419	H2O420	H2O421	H2O422	H2O423	H2O424	H2O425	H2O426	H2O427	H2O428	H2O429	H2O430	H2O431	H2O432	H2O433	H2O434	H2O435	H2O436	H2O437	H2O438	H2O439	H2O440	H2O441	H2O442	H2O443	H2O444	H2O445	H2O446	H2O447	H2O448	H2O449	H2O450	H2O451	H2O452	H2O453	H2O454	H2O455	H2O456	H2O457	H2O458	H2O459	H2O460	H2O461	H2O462	H2O463	H2O464	H2O465	H2O466	H2O467	H2O468	H2O469	H2O470	H2O471	H2O472	H2O473	H2O474	H2O475	H2O476	H2O477	H2O478	H2O479	H2O480	H2O481	H2O482	H2O483	H2O484	H2O485	H2O486	H2O487	H2O488	H2O489	H2O490	H2O491	H2O492	H2O493	H2O494	H2O495	H2O496	H2O497	H2O498	H2O499	H2O500	H2O501	H2O502	H2O503	H2O504	H2O505	H2O506	H2O507	H2O508	H2O509	H2O510	H2O511	H2O512	H2O513	H2O514	H2O515	H2O516	H2O517	H2O518	H2O519	H2O520	H2O521	H2O522	H2O523	H2O524	H2O525	H2O526	H2O527	H2O528	H2O529	H2O530	H2O531	H2O532	H2O533	H2O534	H2O535	H2O536	H2O537	H2O538	H2O539	H2O540	H2O541	H2O542	H2O543	H2O544	H2O545	H2O546	H2O547	H2O548	H2O549	H2O550	H2O551	H2O552	H2O553	H2O554	H2O555	H2O556	H2O557	H2O558	H2O559	H2O560	H2O561	H2O562	H2O563	H2O564	H2O565	H2O566	H2O567	H2O568	H2O569	H2O570	H2O571	H2O572	H2O573	H2O574	H2O575	H2O576	H2O577	H2O578	H2O579	H2O580	H2O581	H2O582	H2O583	H2O584	H2O585	H2O586	H2O587	H2O588	H2O589	H2O590	H2O591	H2O592	H2O593	H2O594	H2O595	H2O596	H2O597	H2O598	H2O599	H2O600	H2O601	H2O602	H2O603	H2O604	H2O605	H2O606	H2O607	H2O608	H2O609	H2O610	H2O611	H2O612	H2O613	H2O614	H2O615	H2O616	H2O617	H2O618	H2O619	H2O620	H2O621	H2O622	H2O623	H2O624	H2O625	H2O626	H2O627	H2O628	H2O629	H2O630	H2O631	H2O632	H2O633	H2O634	H2O635	H2O636	H2O637	H2O638	H2O639	H2O640	H2O641	H2O642	H2O643	H2O644	H2O645	H2O646	H2O647	H2O648	H2O649	H2O650	H2O651	H2O652	H2O653	H2O654	H2O655	H2O656	H2O657	H2O658	H2O659	H2O660	H2O661	H2O662	H2O663	H2O664	H2O665	H2O666	H2O667	H2O668	H2O669	H2O670	H2O671	H2O672	H2O673	H2O674	H2O675	H2O676	H2O677	H2O678	H2O679	H2O680	H2O681	H2O682	H2O683	H2O684	H2O685	H2O686	H2O687	H2O688	H2O689	H2O690	H2O691	H2O692	H2O693	H2O694	H2O695	H2O696	H2O697	H2O698	H2O699	H2O700	H2O701	H2O702	H2O703	H2O704	H2O705	H2O706	H2O707	H2O708	H2O709	H2O710	H2O711	H2O712	H2O713	H2O714	H2O715	H2O716	H2O717	H2O718	H2O719	H2O720	H2O721	H2O722	H2O723	H2O724	H2O725	H2O726	H2O727	H2O728	H2O729	H2O730	H2O731	H2O732	H2O733	H2O734	H2O735	H2O736	H2O737	H2O738	H2O739	H2O740	H2O741	H2O742	H2O743	H2O744	H2O745	H2O746	H2O747	H2O748	H2O749	H2O750	H2O751	H2O752	H2O753	H2O754	H2O755	H2O756	H2O757	H2O758	H2O759	H2O760	H2O761	H2O762	H2O763	H2O764	H2O765	H2O766	H2O767	H2O768	H2O769	H2O770	H2O771	H2O772	H2O773	H2O774	H2O775	H2O776	H2O777	H2O778	H2O779	H2O780	H2O781	H2O782	H2O783	H2O784	H2O785	H2O786	H2O787	H2O788	H2O789	H2O790	H2O791	H2O792	H2O793	H2O794	H2O795	H2O796

## ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN  
TRENT

STL

STL Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404Website: www.stl-inc.com  
Phone: (912) 354-7858  
Fax: (912) 352-0165

Alternate Laboratory Name/Location

Phone:  
Fax:

PROJECT REFERENCE <i>Solutia Area 2</i>	PROJECT NO. <i>21561683</i>	PROJECT LOCATION (STATE) <i>IL</i>	MATRIX TYPE	REQUIRED ANALYSIS										PAGE <i>1</i>	OF <i>1</i>		
STL (LAB) PROJECT MANAGER <i>Lidia Guilizzia</i>	P.O. NUMBER	CONTRACT NO.	COMPOSITE (C) OR GRAB (G) INDICATE AQUEOUS (WATER) SOLID OR SEMISOLID AIR NONAQUEOUS LIQUID (OIL, SOLVENT...)	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	STANDARD REPORT DELIVERY <input checked="" type="checkbox"/>	
CLIENT (SITE) PM <i>Bob Veenstra</i>	CLIENT PHONE <i>314-422-0100</i>	CLIENT FAX <i>314-422-0462</i>		<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	DATE DUE
CLIENT NAME <i>URS Corp.</i>	CLIENT E-MAIL			<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	EXPEDITED REPORT DELIVERY (SURCHARGE) <input type="checkbox"/>
CLIENT ADDRESS <i>1001 Highlands Plaza Dr. W. Ste 300 St. Louis, MO 63103</i>				<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	<i>HL</i>	DATE DUE
COMPANY CONTRACTING THIS WORK (if applicable)														NUMBER OF COOLERS SUBMITTED PER SHIPMENT:			

SAMPLE		SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NUMBER OF CONTAINERS SUBMITTED										REMARKS
DATE	TIME						3	2	2	1	1	1	3	1	1	1	
7/5/06	1459	SA2-MW-4-0	X				3	2	2	1	1	1	3	1	1	1	*Ship the containers received & return to STL Sacramento Attn: Robert Arambak 7/6/06
		*received 2-1ltambars for Dioxin analysis, client was supposed to ship directly to STL Sacramento															Shipped per memo
		RECEIVED IN GOOD CONDITION UNDER COC															
		JUL 7 2006															
		INT: SS															

RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>7/5/06</i>	TIME <i>17:40</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>7/5/06</i>	TIME <i>18:15</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>7/5/06</i>	TIME <i>18:15</i>	RELINQUISHED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>7/7/06</i>	TIME <i>18:45</i>
RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>7/5/06</i>	TIME <i>17:40</i>	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>7/5/06</i>	TIME <i>18:15</i>	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>7/5/06</i>	TIME <i>18:15</i>	RECEIVED BY: (SIGNATURE) <i>[Signature]</i>	DATE <i>7/7/06</i>	TIME <i>11:00</i>
LABORATORY USE ONLY											
RECEIVED FOR LABORATORY (SIGNATURE) <i>[Signature]</i>	DATE <i>7/5/06</i>	TIME <i>09:46</i>	CUSTODY INTACT YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	CUSTODY SEAL NO.	STL SAVANNAH LOG NO. <i>1010/10/56</i>	LABORATORY REMARKS					

SEVERN  
TRENT

STL

CHAIN OF CUSTODY RECORD

QUOTE #

SEVERN TRENT LABORATORIES, INC.

Page: 1 of 1

Customer Information		Project Information		Analysis/Methods	
PO:		Project Name:	SA2 Supplemental Investigation	A	Dioxin
WO:		Project Number:		B	
Company:	URS CORPORATION	Bill To:		C	
Report to:	1001 HIGHLANDS PLAZA DRIVE WEST	Invoice ATTN:		D	
Address:	SUITE 300	Address:		E	
	ST. LOUIS MO 63110			F	
E-mail:				G	
Phone:	314-429-0100	Phone:		H	
Fax:	314-429-0562	Fax:		I	Other:
				J	

No.	Sample Description	Preservation	Date	Time	Type	Matrix	# Containers	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	SA2-MW-4-M	SEE ANALYSIS/METHODS	7/6/06		---	Water	2	X														
2	SA2-MW-4-S	SEE ANALYSIS/METHODS	7/6/06		---	Water	2	X														
3		SEE ANALYSIS/METHODS			---	Water																
4		SEE ANALYSIS/METHODS			---	Water																
5		SEE ANALYSIS/METHODS			---	Water																
6		SEE ANALYSIS/METHODS			---	Water																
7		SEE ANALYSIS/METHODS			---	Water																
8		SEE ANALYSIS/METHODS			---	Water																
9		SEE ANALYSIS/METHODS			---	Water																
10		SEE ANALYSIS/METHODS			---	Water																

Sampler:		Shipment Method:		Date Due (fax):	
1. Relinquished by:	Date:	2. Received by:	Date:	3. Relinquished by:	Date:
Rel'd Mill	7/6/06	Rel'd Mill	7/6/06	Rel'd Mill	7/6/06
Company:	Time:	Company:	Time:	Company:	Time:
URS	17:15	TWI-LITE EXP	17:15	TWI-LITE EXP	17:50
4. Received by:		Date:		Date:	
Rel'd Mill		7/6/06		7/6/06	
Company:		Time:		Time:	
STL St. Louis		17:50		17:50	

Comments:	Relinq: Rel'd Mill	07-06-06	1830	Rel'd By:	Cheng	7/7/06-1830	Standard turn	Other
							Rush turn	

Severn Trent Laboratories, Inc.

5102 LaRoche Avenue

Savannah GA

Phone: 912-354-7858

Fax: 912-351-3673

Project Manager:

- Rec'd 1 of 2 A&amp;D Broken - ev 7/7/06







**SDG No:**  
**SAS044**

# DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/3/2006  
Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS044  
Review Level: Level IV

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

Analytes in sample NAPL-C-139 were qualified due to surrogate recoveries.

Field IDs: Soil-Q-21-SS-0.5' TB-2 NAPL-A-138  
Soil-Q-21-SB-4' NAPL-B-34' TB-4  
TB-1 NAPL-B-139  
NAPL-C-31 TB-3  
NAPL-C-139 NAPL-A-40

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt,	x		

Note: The laboratory case narrative indicated acetone was detected in method blank 680-44940/7. Surrogates 4-bromofluorobenzene and toluene-d8 were outside evaluation criteria in sample NAPL-C-139. The internal standard chlorobenzene-d5 recovered outside QC limits in sample NAPL-C-139 Chlorobenzene was detected at 290 µg/L in sample NAPL-C-139 the results were high biased due to sample carry over in the preceding sample. The sample was reanalyzed with a result of 33 µg/L.

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).	x		
	Matrix Preserved Aromatic All others			
	Aqueous No 7 days 14 days			
	Yes 14 days 14 days			
	Soil/Sediment 4 °C + 2 °C 14 days 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: Sample TB-1 was analyzed approximately two hours outside of holding time. All analytes were non-detect, and the sample was a trip blank, therefore no qualifications were required.

### GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	x		
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	x		

Note: All tuning criteria was met.

### 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: Method blank 680-44940/7 had a positive result for acetone. All samples associated with this method blank were non-detect for acetone, therefore, no qualifications of data were required. All raw data was reviewed and acetone was verified in the method blank.

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	x		

Note: Initial calibration was within evaluation criteria. Recalculations of the RRFs and %RSD were performed, and no errors in calculation were noted.

### 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	x		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?		x	
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.	x		

Note: A continuing calibration standard was not analyzed every 12 hours because samples were not all analyzed on the same day, although all samples were analyzed within 12 hours after a standard was analyzed. Continuing calibration compounds met criteria. Recalculations of the RF and %D for one compound per standard were completed, and no errors in calculation were noted.

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			
	> UCL                      10% to LCL                      < 10%			
	Positive                      J                      J                      J			
	Non-detect                      None                      UJ                      R			

Note: The surrogates 4-bromofluorobenzene (64%) with criteria (65-128%) and toluene-d8 (49%) with criteria (68-121%) were outside of evaluation criteria in sample NAPL-C-139. This sample was reanalyzed and surrogate 4-bromofluorobenzene was outside of evaluation criteria. All detected analytes were qualified as estimated "J" and all non-detected analytes qualified estimated non-detect "UJ". The data used as part of this validation for sample NAPL-C-139 is from the reanalysis. The original analysis data is not intended for use.

Field ID	Analyte(s)	Qualification	Code	Justification	Run #
NAPL-C-139	Chloromethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Bromomethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Vinyl chloride	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Chloroethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Methylene chloride	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Carbon disulfide	J	S	Surrogate recovery low	680-44932
NAPL-C-139	1,1-Dichloroethene	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	1,1-Dichloroethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	cis-1,2-Dichloroethene	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	trans-1,2-Dichloroethene	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Chloroform	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	1,2-Dichloroethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	1,1,1-Trichloroethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Carbon tetrachloride	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Bromodichloromethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	1,1,2,2-Tetrachloroethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	1,2-Dichloropropane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	trans-1,3-Dichloropropene	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Trichloroethene	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Dibromochloromethane	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	cis-1,3-Dichloropropene	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Bromoform	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	2-Hexanone	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	4-Methyl-2-pentanone	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Tetrachloroethene	UJ	S	Surrogate recovery low	680-44932
NAPL-C-139	Chlorobenzene	J	S	Surrogate recovery low	680-44932
NAPL-C-139	Styrene	UJ	S	Surrogate recovery low	680-44932

**8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)**

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: Samples were not spiked for VOCs analysis.

**9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)**

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+); <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: LCS samples were within evaluation criteria, and % recoveries were recalculated and no errors in calculation were noted.

**10.0 Internal Standards (Code I)**

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?		x	
	Area > +100%      Area < -50%      Area < -10%			
	Positive      J      J      J			
	Non-detect      None      UJ      R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

The internal standard chlorobenzene-d5 had an area that was below the lower limit for sample NAPL-C-139, the sample was reanalyzed and the area was also below the lower limit. Sample was previously qualified due to surrogate recoveries, no

Note: qualifications of data were required

**11.0 TCL Identification (Code W)**

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	x		

Note: For the validation of compound quantitation, ten percent of the detected results were recalculated from the raw data, and no calculation errors were noted.

## 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: No field duplicates were submitted for VOC analysis.

## 14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous	x		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$			
	% Completeness			

Note:

**DATA VALIDATION WORKSHEET  
SEMIVOLATILE ORGANIC ANALYSIS**

**Reviewer:** Tony Sedlacek  
**Date:** 7/5/2006  
**Laboratory:** Severn Trent Laboratory - Savannah

**Project Name:** SA2 Sup. Investigation  
**Project Number:** 21561683.80011  
**SDG No.:** SAS044  
**Review Level:** Level IV

**Major Anomalies:**

4,6-Dinitro-2-methylphenol, and Dinoseb in sample NAPL-A-40 were rejected due to %D > 50% between ICAL and CCAL RRFs.  
 2,4-Dinitrophenol, and Pentachlorophenol were rejected due to MS/MSD results of zero.

**Minor Anomalies:**

Samples were qualified due to method blank contamination, ICAL R<sup>2</sup> < 0.990, %D > 20% between ICAL and CCAL RRFs, and internal standard > 100%.

**Field IDs:**

Soil-Q-21-SS-0.5'	TB-2	NAPL-A-138
Soil-Q-21-SB-4'	NAPL-B-34'	TB-4
TB-1	NAPL-B-139	
NAPL-C-31	TB-3	
NAPL-C-139	NAPL-A-40	

**1.0 Chain of Custody/Sample Condition**

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated Bis (2-ethylhexyl) phthalate was detected above the MDL, but below the RL in method blanks 680-45218 and 680-16419-7. Surrogates were diluted out of samples: Soil-Q-21-SS-0.5, and Soil-Q-SS-0.5 MS/MSD. MS/MSD recoveries were low in sample Soil-Q-21-SS-05. Internal standards were outside control limits in samples NAPL-C-31, NAPL-B-139, and NAPL-A-138. These samples were reanalyzed to confirm internal standards were outside control limits.

**2.0 Holding Time/ Preservation (Code H)**

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days)		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.



### 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	x		
3.2	Have all samples been analyzed within twelve hours of the tune?	x		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note: All tuning criteria was met.

### 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: Bis(2-ethylhexyl)phthalate was detected in method blank 680-45218 in batch 680-45377. Sample NAPL-A-40 was associated with this analysis batch and Bis(2-ethylhexyl)phthalate was detected and qualified non-detected "U". Also, no field blanks were part of this SDG. Raw data was reviewed and Bis(2-ethylhexyl)phthalate was verified as a detection in the method blank.

Field ID	Analyte(s)	Qualification	Code	Justification	Run #
NAPL-A-40	Bis(2-ethylhexyl)phthalate	U	Z	Method blank contamination	680-45377

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	x		

Note: Initial calibration for instrument MSN5973 had compound 2,4-Dinitrotoluene (.988) with  $R^2 < 0.990$ . The initial calibration for instrument MST5973 had compound Pentachlorophenol (.986) with  $R^2 < 0.990$ . Compound Dinoseb(38%) had %RSD >15%. All samples were nondetect for 2,4-Dinitrotoluene and were qualified estimated non-detected "UJ". Pentachlorophenol was previously qualified due to MS/MSD recoveries, and Dinoseb was previously qualified due to continuing calibration. Recalculations of the RRFs and %RSD were performed, and no errors in calculation were noted.

Field ID	Analyte(s)	Qualification	Code	Justification	Run #
Soil-Q-21-SB-4	2,4-Dinitrotoluene	UJ	C	ICAL R ^ 2 <0.990	680-45106
Soil-Q-21-SS-0.3	2,4-Dinitrotoluene	UJ	C	ICAL R ^ 2 <0.990	680-45106
NAPL-C-31	2,4-Dinitrotoluene	UJ	C	ICAL R ^ 2 <0.990	680-45106
NAPL-C-139	2,4-Dinitrotoluene	UJ	C	ICAL R ^ 2 <0.990	680-45106
NAPL-B-34	2,4-Dinitrotoluene	UJ	C	ICAL R ^ 2 <0.990	680-45106
NAPL-B-139	2,4-Dinitrotoluene	UJ	C	ICAL R ^ 2 <0.990	680-45106
NAPL-A-40	2,4-Dinitrotoluene	UJ	C	ICAL R ^ 2 <0.990	680-45377
NAPL-A-138	2,4-Dinitrotoluene	UJ	C	ICAL R ^ 2 <0.990	680-45106

#### 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		x	
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.	x		

Note: The following compounds have %D < 20% between the ICAL and CCAL RRFs for samples associated continuing calibration dates 5/18/06: 2,6-Dinitrotoluene(30.1%), 4,6-Dinitro-2-methylphenol(21.5%), Pentachlorophenol(-20.5%). Compounds from CC date 5/23/06: 2,6-Dinitrotoluene(29.7%), 2,4-Dinitrophenol(41.3%), 4,6-Dinitro-2-methylphenol(52.4%), Benzo (k) fluoranthene(22.4%), and Dinoseb(74.7%). These compounds were all non-detect in all associated samples and were qualified estimated non-detect "UJ", and compounds with a %D > 50% were qualified Rejected "R". Pentachlorophenol and 2,4-Dinitrophenol were previously qualified due to MS/MSD recoveries. Recalculation of the RF and %D for one compound per standard was completed, and no errors in the calculations were noted.

Field ID	Analyte(s)	Qualification	Code	Justification	Run #
Soil-Q-21-SB-4	2,6-Dinitrotoluene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
Soil-Q-21-SS-0.3	2,6-Dinitrotoluene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-C-31	2,6-Dinitrotoluene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-C-139	2,6-Dinitrotoluene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-B-34	2,6-Dinitrotoluene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-B-139	2,6-Dinitrotoluene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-A-40	2,6-Dinitrotoluene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-A-138	2,6-Dinitrotoluene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
Soil-Q-21-SB-4	4,6-Dinitro-2-methylphenol	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
Soil-Q-21-SS-0.3	4,6-Dinitro-2-methylphenol	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-C-31	4,6-Dinitro-2-methylphenol	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-C-139	4,6-Dinitro-2-methylphenol	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-B-34	4,6-Dinitro-2-methylphenol	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-B-139	4,6-Dinitro-2-methylphenol	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-A-138	4,6-Dinitro-2-methylphenol	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45106
NAPL-A-40	4,6-Dinitro-2-methylphenol	R	C	%D >50% between ICAL and CCAL RRFs	680-45377
NAPL-A-40	Benzo[k]fluoranthene	UJ	C	%D >20% between ICAL and CCAL RRFs	680-45377
NAPL-A-40	Dinoseb	R	C	%D >50% between ICAL and CCAL RRFs	680-45377

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	x	x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL                      10% to LCL                      < 10%			
	Positive                      J                      J			
	Non-detect                      None                      UJ                      R			

Note: The surrogates in samples Soil-Q-21-SS-0.5 and Soil-Q-21-SS-0.5 MS/MSD were not recovered due to a dilution. All other surrogates were within evaluation criteria for all other samples. Therefore, no qualifications of data were required.

## 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The spike recoveries were zero for compounds 2,4-Dinitrophenol, and Pentachlorophenol in sample Soil-Q-21-SS-0.5, and were qualified rejected "R".

Field ID	Analyte(s)	Qualification	Code	Justification	Run #
Soil-Q-21-SS-0.5	2,4-Dinitrophenol	R	M	MS/MSD recovery of zero	680-45106
Soil-Q-21-SS-0.5	Pentachlorophenol	R	M	MS/MSD recovery of zero	680-45106

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.	x		

Note: All LCS were within evaluation criteria. Ten percent of the spiking compound recoveries for the LCS were recalculated using the LCS summary form, and no calculation or transcription errors were noted.

### 10.0 Inter. standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	Area > +100%                      Area < -50%                      Area < -10%			
	Positive                      J                      J                      J			
	Non-detect                      None                      UJ                      R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	<input checked="" type="checkbox"/>		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: The internal standard area were outside of the QC limits in samples NAPL-C-31, NAPL-B-139, and NAPL-A-138. All detected analytes were qualified as estimated "J". The compound 4-chloroaniline result was already estimated, because the result was between the MDL and RL, no qualification of data was required. These samples were reanalyzed to confirm that the internal standards were outside of control limits and the reanalysis confirmed the internal standards were outside evaluation criteria. The results from the original analysis for samples NAPL-C-31, NAPL-B-139 and NAPL-A-138 were used for this validation.

### 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	<input checked="" type="checkbox"/>		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	<input checked="" type="checkbox"/>		

Note:

### 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	<input checked="" type="checkbox"/>		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	<input checked="" type="checkbox"/>		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	<input checked="" type="checkbox"/>		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		<input checked="" type="checkbox"/>	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	<input checked="" type="checkbox"/>		

Note: For the validation of compound quantitation, approximately ten percent of the detected compound results were recalculated from the raw data, and no calculation errors were noted.

### 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
13.2	Were all RPD or absolute difference values within the control limits?	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	No action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate were not submitted for SVOC analysis.

#### 14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample,		x		
14.2	Number of samples:	12			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	4			
	$\% \text{ Completeness} = 100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	<b>% Completeness</b>	<b>99.48717949</b>			

Note:

# DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/5/2006  
Laboratory Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS044  
Review Level: Level III

Major Anomalies:  
None

Minor Anomalies:  
MCPA was qualified in samples Soil-Q-SS-0.5, and Soil-Q-SB-4' for continuing calibration outside evaluation criteria.

Field IDs: Soil-Q-21-SS-0.5  
Soil-Q-21-SB-4'

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	<input checked="" type="checkbox"/>		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	<input checked="" type="checkbox"/>		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Note: The laboratory case narrative indicated the grand mean was exception was applied to continuing calibration verification standards. The LCS/LCSD recovery for 2,4-DB was outside evaluation criteria.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	<input checked="" type="checkbox"/>		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-). Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days		<input checked="" type="checkbox"/>	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		<input checked="" type="checkbox"/>	

Note: All holding times were met.

### 3.0 Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field/rinse/equipment blanks were not part of this SDG.

### 4.0 Initial Calibration (Code r)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: The compound MCPA has an R<sup>2</sup> value of 0.990 which is <0.995. All associated samples will be qualified estimated "J" for detects and estimated non-detected "UJ" for all non-detects.

Field ID	Analyte(s)	Qualification	Code	Justification	Run #
Soil-Q-21-SS-	MCPA	UJ	r	ICAL R <sup>2</sup> <0.995	680-44820
Soil-Q-21-SB-	MCPA	UJ	r	ICAL R <sup>2</sup> <0.995	680-44766

### 5.0 Continuing Calibration (Code c)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from ave CF to verify correct calculations.			x

Note: The grand mean exception was applied to continuing calibration verification standards. This rule is described in Method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference (%D) of all the compounds in the CCV is less than or equal to 15 %.

## 6.0 Surrogate Recovery (Code s)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All surrogate recoveries were within evaluation criteria.

## 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample Soil-Q-21-SB-4' was spiked and analyzed for herbicides and all MS/MSD recoveries were within evaluation criteria.

## 8.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: LCS/LCSD recovery is above evaluation criteria for 2,4-DB, all compounds were non-detected in associated samples. Therefore, no qualifications of data were required.

## 9.0 TCL Identification (Code w)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		

Note:



### 10.0 Quantitation and Reported Detection limits (Code p)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?	x		
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

### 11.0 Field Duplicate Samples (Code f)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: There were no field duplicates submitted for herbicide analysis.

### 12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90%	x		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			

Note:

**DATA VALIDATION WORKSHEET - Level III Review**  
**Inorganic - ICP, ICP-MS, AAS, and CVAA**

**Reviewer:** \_\_\_\_\_ **Tony Sedlacek**  
**Date:** \_\_\_\_\_ **7/6/2006**  
**Laboratory:** \_\_\_\_\_ **Severn Trent Laboratory - Savannah**

**Project Name:** Sauget - Area 2  
**Project Number:** 21561683.80011  
**SDG No.:** SAS044  
**Review Level:** Level IV

**Major Anomalies:**

No samples were rejected

**Minor Anomalies:**

Sodium was qualified non-detect "U" in sample Soil-Q-21-SB-4' due to blank contamination.

**Field IDs:** Soil-Q-21-SS-0.5  
 Soil-Q-21-SB-4'

**1.0 Chain of Custody/Sample Condition/Raw Data**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

**Note:** The laboratory case narrative indicated copper, potassium, and sodium was detected in the method blank. Matrix spike recovery was outside evaluation criteria for mercury in sample Soil-Q-21-4'.

**2.0 Holding Time (Code h)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									x	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).		x									x	

**Note:** All samples met holding time criteria.

### 3.0 Instrum Calibration (Code c)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	x									x		
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	x									x		
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	x									x		
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	x									x		
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)	x									x		
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note: The calibration standards are listed in %RSD not correlation coefficients for CVAA, and all were within evaluation criteria.

### 4.0 Blanks (Code o - Calibration blank failure, Code p - Preparation blank failure, Code x - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Copper, potassium, and sodium were detected in the method blank, copper and potassium were both detected in the samples at levels higher than 5X the blank contamination, no qualification of data was required. Sodium was detected in sample Soil-Q-21-SS-0.5 at levels higher than 5X the blank contamination, therefore no qualification of data was required. Sodium was also detected in sample Soil-Q-21-SB-4' at levels less than the blank contamination and was qualified as non-detect "U". The ICB and CCB had reported values above the IDL for Beryllium, calcium, chromium, copper, vanadium, and zinc. The ICB and CCB values had no affect on sample results, due to sample results were greater than 5X the ICB, and CCB values, no qualifications of data were required.

Field ID	Analyte(s)	Qualification	Code	Justification
Soil-Q-21-SB-4	Sodium	U	p	Method Blank contamination

#### 5.0 ICP Interference Check Sample (ICS) (Code n)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	x											
5.2	Are the ICS AB recoveries within 80% - 120%?	x											
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?		x										
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?		x										
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)												
	< -IDL > IDL < 50% 50% - 79% > 120%												
	UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)												

Note: Copper, lead, and zinc had ICS A values greater than the IDL, and aluminum, calcium, iron, and magnesium sample results were much greater than the spiked sample in the ICS. Due to high levels of target analytes in the samples, no qualifications of data were required.

#### 6.0 Laboratory Control Sample (LCS) (Code l - Recovery, Code e - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
	Action: Solid Aqueous												
	< LCL > UCL < 50% 50% - 79% > 120%												
	J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)												

Note: All LCS were within evaluation criteria.

#### 7.0 Laboratory Duplicates (Code k)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.		x								x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x							x		

Note: A laboratory duplicate was not prepared and analyzed on ICP analysis. Professional judgment was used to not qualify data based on all other QC data was within evaluation criteria for ICP analysis.

## 8.0 Spike & Matrix Analysis -Pre-Digestion (Code m - Recovery, Code d - RPD)

		ICP			ICP-MS			GFAA			CVAA		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.		x								x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)			x								x	
	%R > 125%												
	30% < %R < 74%												
	%R < 30%												
	Positive J												
	Non-detect None												

Note: Samples were not spiked and analyzed for ICP analysis, but sample Soil-Q-21-SB-4' was spiked and analyzed for mercury. MS recovery for mercury was 131%, the MSD result was 90% within the control limit of 80-120%. Thus, since the MSD was within control limits and the RPD was within QC limits no qualification

## 9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?	x									x		

Note:

## 10.0 ICP Serial Dilutions (Code s)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note:

## 11.0 Field Duplicate Samples (Code f)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 35% or difference < $\pm 2 \times \text{PQL}$ and For solids, RPD < 50% or difference < $\pm 4 \times \text{PQL}$ )			x									x

Note: No field duplicates were submitted for metals analysis.

## 12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-17	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	x									x	
12.2	Were all dilution reflected in the positive results and detection limits?	x									x	

Note:

## 13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)									
13.2	Number of samples:	2		0			0			2
13.3	Number of target compounds in each analysis:	22		0			0			1
13.4	Number of results rejected and not reported:	0		0			0			0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$									
	% Completeness	100		###			###			100

Note:

# DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/6/2006  
Laboratory: Severn Trent Laboratory - Savannah  
Test Name: Ammonia, TOC  
Method No.: 350.1, 9060

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS044  
Review Level: Level IV

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

Sample Soil-Q-21-SS-0.5 was qualified due to MS/MSD recovery for ammonia.

Field IDs: Soil-Q-21-SS-0.5 NAPL-B-34  
Soil-Q-21-SB-4' NAPL-B-139  
NAPL-C-31 NAPL-A-40  
NAPL-C-139 NAPL-A-138

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: MS/MSD recovery for ammonia was outside evaluation criteria for sample Soil-Q-21-SS-0.5.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

### 3.0 Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: No field/rinse/equipment blank were submitted for analysis. Raw data was reviewed and verified that no detections were found in the blanks.

### 4.0 Initial Calibration (Code c)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.	x		

Note: Initial calibration was not expressed in correlation coefficients, it was expressed in %R and all were within evaluation criteria. Approximately 50 percent of the initial calibration and ICV recoveries were recalculated and compared to the raw data; no calculation or transcription errors

### 5.0 Continuing Calibration (Code r)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 10 samples?	x		
5.3	Do any analytes have a %R outside QC limits (80-120%)?		x	
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.	x		

Note: Continuing calibration criteria was within evaluation criteria. Approximately 10 percent of the CV sample recoveries were recalculated and compared to the raw data. No calculation or transcription errors were noted.

### 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD recoveries for ammonia (71/72%) were outside evaluation criteria ((75-125%) in sample Soil-Q-21-SS-0.5. Ammonia was qualified estimated "J" in sample Soil-Q-21-SS-0.5.



Field	Analyte(s)	Qualification	Code	Justification	Run
Soil-Q-21-SS-0	Ammonia	J	m	Low MS/MSD recovery	680-45836

#### 7.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries within evaluation criteria, and % recoveries were recalculated and no errors were found in calculations.

#### 8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

#### 9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?	x		
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
9.4	If Level IV, calculate a sample of positive results to verify correct calculations	x		

Note: For the validation of compound quantitation, ten percent of the detected results were recalculated from the raw data, and no calculation errors were noted.

#### 10.0 Field Duplicate Samples (Code f)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

### 11.0 Laboratory Duplicates (Code k)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm 2 \times$ PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: No laboratory duplicates were performed for TOC or ammonia analysis.

### 12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for solids)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			

Note:

**SDG No:**  
**SAS045**

# DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/21/2006  
Laboratory Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS045  
Review Level: Level III

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

Analytes required qualification due to continuing calibration %D > 20% and high surrogate recovery.

Field IDs:    NAPL-A-(75-80)            NAPL-B-(80-85)            NAPL-C-(20-25)  
                  NAPL-A-(95-100)        NAPL-B-(110-115)        NAPL-C-(65-70)  
                  NAPL-A-(105-110)        NAPL-B-138                NAPL-C-(100-105)  
                  NAPL-B-(20-25)            NAPL-C-31-D                TB-4

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated acetone was detected in method blank 680-45894. All surrogates were outside of evaluation criteria in sample NAPL-C-31-D. LCS recovery was outside evaluation criteria for acetone in LCS sample 680-45893/3 and LCSD sample 680-45893/4. An LCSD was not analyzed for with analysis batch 680-45876, which only contained a method blank and trip blank analysis.

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix                      Preserved                      Aromatic                      All others			
	Aqueous                      No                      7 days                      14 days			
	Yes                      14 days                      14 days			
	Soil/Sediment              4 °C ± 2 °C                      14 days                      14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).	x		

Note: All holding times were met.

### 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	x		
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	x		

Note: All BFB criteria has been met.

### 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Acetone was detected in method blank 680-45894. Sample NAPL-C-31-D was associated with this method blank and was nondetect for acetone. No qualification of data was required.

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: All initial calibration criteria was met.

### 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	x		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note: A continuing calibration standard was not analyzed every 12 hours, although all samples were analyzed within 12 hours of the standard being analyzed. Compounds acetone (30.3%), carbon disulfide (29.1%), 2-butanone 22.1%, chloroethane (23.0%) and methylene chloride (22.5%) had %D > 20% between initial and continuing calibration outside QC limits. All detected compounds

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
NAPL-B-138	Acetone	J	C	680-4	CCAL %D > 20
NAPL-B-138	Carbon Disulfide	J	C	680-4	CCAL %D > 20

#### 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?		x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)	x		
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: Surrogates in sample NAPL-C-31-DDL were outside evaluation criteria. All positive analytes were qualified estimated "J".

Field ID	Analyte(s)	Qualification	Code	Run	Justification
NAPL-C-31-DI	Chlorobenzene	J	S	680-	Surrogate recovery high

#### 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample NAPL-B-138 was spiked and analyzed for VOCs and was within evaluation criteria.

#### 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: LCS/LCSD recoveries for acetone (150/144%) were outside QC limits (28-143%) in sample LCS/LCSD samples 680-45893/3 and 680-45893/4. Acetone was previously qualified due to continuing calibration, no further qualifications are required.

### 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100%			
	Area < -50%			
	Area < -10%			
	Positive J J J			
	Non-detect None UJ R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: All internal standard area counts and retention times within evaluation criteria.

### 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

### 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	x		
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Positive results were reported that exceed the linear range, but these samples were diluted and the diluted results were also reported.

**13.0 Field Duplicate Samples (Code F)**

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: No field duplicates were submitted for VOC analysis.

**14.0 Data Completeness**

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		<input checked="" type="checkbox"/>		
14.2	Number of samples:	12			
14.3	Number of target compounds in each analysis:	34			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

Note:



# DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/24/2006  
Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget Area 2 Supp. Investigation  
Project Number: 21561683.80011  
SDG No.: SAS045  
Review Level: Level III

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

Samples were qualified due to method blank contamination and  $r^2 < 0.990$  in the initial calibration.

Field IDs: NAPL-A-(75-80) NAPL-B-(80-85) NAPL-C-(20-25)  
NAPL-A-(95-100) NAPL-B-(110-115) NAPL-C-(65-70)  
NAPL-A-(105-110) NAPL-B-138 NAPL-C-(100-105)  
NAPL-B-(20-25) NAPL-C-31-D TB-4

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

The laboratory case narrative indicated compounds Bis (2-ethylhexyl) phthalate and Din-n-butyl phthalate were detected in method blank 680-45940.

Note: Surrogates recoveries were outside evaluation criteria for sample NAPL-B-138 MSD. MS/MSD recoveries were outside evaluation criteria in sample

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days)		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

## 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	x		
3.2	Have all samples been analyzed within twelve hours of the tune?	x		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note: All DFTPP tuning met criteria.

#### 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Di-n-butyl phthalate and Bis(2-ethylhexyl) phthalate were detected in method blank 680-45940/12-A. Di-n-butyl phthalate was nondetect in sample NAPL-B-138 and NAPL-C-31-D, no qualification of data was required. Bis(2-ethylhexyl) phthalate was detected in samples NAPL-B\_138 and NAPL-

Note: C-31-D less than 10X the blank concentration and was qualified "U".

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
NAPL-B-138	Bis(2-ethylhexyl) phthalate	U	Z	680-46657	MB contamination
NAPL-C-31-D	Bis(2-ethylhexyl) phthalate	U	Z	680-46657	MB contamination

#### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Initial calibration compounds 2,4-Dinitrophenol (.988) and Benzo(b)fluoranthene (0.986) had  $r^2$  values less than 0.990. All associated samples were nondetect for 2,4-Dinitrophenol and Benzo(b)fluoranthene, therefore were qualified "UJ".

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
NAPL-C-31-D	Benzo(b)fluoranthene	UJ	C	680-46978	$r^2 < 0.990$
NAPL-B-138	2,4-Dinitrophenol	UJ	C	680-46822	$r^2 < 0.990$

## 6.6 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		x	
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

A continuing calibration standard was not analyzed every 12 hours, but the samples were analyzed within 12 hours of the standard being analyzed. Compounds 2,4-Dinitrophenol (26.1%), 4-Nitrophenol (28.2%), 4-Nitroaniline (27.2%), 4,6-Dinitro-2-methylphenol (28.3%), N-Nitrosodiphenylamine (29.8%), 3,3'-Dichlorobenzidine (23.6%), Di-n-octylphthalate (24.7%), Benzo(b)fluoranthene (31.3%) and Indeno(1,2,3-cd) pyrene (21.8%) had %D outside of QC limits (%D < 20%). These compounds are associated with the continuing calibration sample that was analyzed with method blank 680-

Note: 45940/12-A, LCS sample 680-45940/13-A and NAPL-B-138 MS/MSD. Therefore, no qualification of data was required.

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL                      10% to LCL                      < 10%			
	Positive                      J                      J                      J			
	Non-detect                      None                      UJ                      R			

Note: Surrogates phenol-d5, 2-fluorophenol and nitrobenzene-d5 were outside evaluation criteria in sample NAPL-B-138 MS/MSD. Surrogates outside evaluation criteria in MS/MSD samples do not require qualifications. Surrogates in all other samples were within evaluation criteria.

### 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits; therefore, no qualification of data was

### 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: All LCS were within criteria.

### 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing	x	x	
	Area > +100% Positive J Non-detect None			
	Area < -50% J UJ			
	Area < -10% J R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standards outside QC limits in the matrix spike duplicate for sample NAPL-B-138. MS/MSD samples are not qualified due to internal

### 11.0 L Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

### 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

### 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x	x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	No action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: No field duplicates were submitted for SVOC analysis.

### 14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample,	x		
14.2	Number of samples:			12
14.3	Number of target compounds in each analysis:			65
14.4	Number of results rejected and not reported:			0
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			
	% Completeness			100

Note:

# DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/24/2006  
Laboratory: Severn Trent Laboratory - Savannah  
Test Name: Total Organic Carbon  
Method No.: 9060

Project Name: Sauget - Area.2  
Project Number: 21561683.80011  
SDG No.: SAS045  
Review Level: Level III

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: NAPL-A-(75-80) NAPL-B-(80-85) NAPL-C-(20-25)  
NAPL-A-(95-100) NAPL-B-(110-115) NAPL-C-(65-70)  
NAPL-A-(105-110) NAPL-B-138 NAPL-C-(100-105)  
NAPL-B-(20-25) NAPL-C-31-D TB-4

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: The laboratory case narrative, chain of custody, and cooler receipt did not indicate any problems.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

## 3.0 Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	x
	Action: Positive sample results $< 5X$ the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field/rinse/equipment blanks were not part of this SDG.

#### 4.0 Initial Calibration (Code c)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x	x	
4.2	Are correlation coefficients stable ( $>0.995$ ) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note: Initial calibration forms were not present but continuing calibration forms were present.

#### 5.0 Continuing Calibration (Code r)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 10 samples?	x		
5.3	Do any analytes have a %R outside QC limits (80-120%)?		x	
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For %R $< 50\%$ , flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note: All continuing calibrating criteria was met.

#### 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries $<10\%$ may require rejection. RPD failures may be flagged "J" (+ only)			

Note: MS/MSD recoveries were within QC limits.

#### 7.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: $\%R > UCL$ , J(+) only; $<LCL$ , J(+)/UJ(-); $<30\%$ J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries are within evaluation criteria.

## 8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?	x		x

Note:

## 9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?	x		
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x	x	
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Reporting limits were not adjusted due to samples not requiring dilutions and percent solids did not affect the RLs.

## 10.0 Field Duplicate Samples (Code f)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x	x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicates were not submitted for TOC analysis.

## 11.0 Laboratory Duplicates (Code k)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note: Sample NAPL-C-(65-70) was duplicated by the laboratory and all RPD's were within criteria.



# 10 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for solids)		x		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			

Note:

**SDG No:**  
**SAS046**

# DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/21/2006  
Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS046  
Review Level: Level III

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

Analytes chloromethane and bromomethane had %D > 20% between the ICAL and CCAL and required qualification in all associated samples.

Field IDs:	OSAA-1-26	OSAA-1-106	TB-7	AA-P-10-62
	OSAA-1-46	UAA-11-22	UAA-11-82	TB-8
	OSAA-1-66	UAA-11-42	UAA-11-102	AA-P-10-82
	OSAA-1-86	UAA-11-62	AA-P-10-22	AA-P-10-102
	TB-6	UAA-11-62-D	AA-P-10-42	AA-P-10-102-D
				AA-P-10-118.5

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the MSD recovery was outside evaluation criteria for chloroethane in sample AA-P-10-42.

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix Preserved Aromatic All others			
	Aqueous No 7 days 14 days			
	Yes 14 days 14 days			
	Soil/Sediment 4 °C + 2 °C 14 days 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

### 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	x		
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	x		

Note: All tuning criteria was met.

### 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blanks met criteria.

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: Initial calibration was within criteria.

### 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	x		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note: A continuing calibration standard was not analyzed every 12 hours, although samples were analyzed with 12 hours of standards being run. Compounds chloromethane (-22.5%) and bromomethane (-45.0%) had %D outside QC limits, all associated data was nondetect and was qualified estimated nondetect "UJ".

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
OSAA-1-26	Chloromethane	UJ	C	680-47063	%D > 20%
OSAA-1-26	Bromomethane	UJ	C	680-47063	%D > 20%
OSAA-1-46	Chloromethane	UJ	C	680-47063	%D > 20%
OSAA-1-46	Bromomethane	UJ	C	680-47063	%D > 20%
OSAA-1-66	Chloromethane	UJ	C	680-47063	%D > 20%
OSAA-1-66	Bromomethane	UJ	C	680-47063	%D > 20%
OSAA-1-86	Chloromethane	UJ	C	680-47063	%D > 20%
OSAA-1-86	Bromomethane	UJ	C	680-47063	%D > 20%
OSAA-1-106	Chloromethane	UJ	C	680-47063	%D > 20%
OSAA-1-106	Bromomethane	UJ	C	680-47063	%D > 20%
UAA-11-22	Chloromethane	UJ	C	680-47063	%D > 20%
UAA-11-22	Bromomethane	UJ	C	680-47063	%D > 20%
UAA-11-42	Chloromethane	UJ	C	680-47063	%D > 20%
UAA-11-42	Bromomethane	UJ	C	680-47063	%D > 20%
UAA-11-62	Chloromethane	UJ	C	680-47063	%D > 20%
UAA-11-62	Bromomethane	UJ	C	680-47063	%D > 20%
UAA-11-62-D	Chloromethane	UJ	C	680-47063	%D > 20%
UAA-11-62-D	Bromomethane	UJ	C	680-47063	%D > 20%
UAA-11-82	Chloromethane	UJ	C	680-47063	%D > 20%
UAA-11-82	Bromomethane	UJ	C	680-47063	%D > 20%
UAA-11-102	Chloromethane	UJ	C	680-47063	%D > 20%
UAA-11-102	Bromomethane	UJ	C	680-47063	%D > 20%
AA-P-10-22	Chloromethane	UJ	C	680-47063	%D > 20%
AA-P-10-22	Bromomethane	UJ	C	680-47063	%D > 20%
AA-P-10-42	Chloromethane	UJ	C	680-47063	%D > 20%
AA-P-10-42	Bromomethane	UJ	C	680-47063	%D > 20%
AA-P-10-82	Chloromethane	UJ	C	680-47063	%D > 20%
AA-P-10-82	Bromomethane	UJ	C	680-47063	%D > 20%
AA-P-10-102	Chloromethane	UJ	C	680-47063	%D > 20%
AA-P-10-102	Bromomethane	UJ	C	680-47063	%D > 20%
AA-P-10-102-D	Chloromethane	UJ	C	680-47063	%D > 20%
AA-P-10-102-D	Bromomethane	UJ	C	680-47063	%D > 20%
AA-P-10-118.5	Chloromethane	UJ	C	680-47063	%D > 20%
AA-P-10-118.5	Bromomethane	UJ	C	680-47063	%D > 20%

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL                      10% to LCL                      < 10%			
	Positive                      J                      J                      J			
	Non-detect                      None                      UJ                      R			

Note: All surrogate recoveries within evaluation criteria.

## 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MSD recovery for chloroethane (196%) was outside evaluation criteria (40-171%) in sample AA-P-10-42. The Matrix spike recovery and RPD were within evaluation and the LCS/LCSD was within criteria. No qualification of data was.

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries within evaluation criteria.

### 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100%      Area < -50%      Area < -10%			
	Positive      J      J      J			
	Non-detect      None      UJ      R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: All internal standard area counts and retention times within evaluation criteria.

### 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

### 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	x		
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Chlorobenzene exceeded the linear range of the instrument in samples UAA-11-102 and AA-P-10-118.5 the samples were diluted (1:2) and (1:5) and the results were within the linear range of the instrument.

### 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Samples UAA-11-62 and AA-P-10-102 were duplicated and analyzed for VOCs. No qualification of data was required.

#### 14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
14.2	Number of samples:	10			
14.3	Number of target compounds in each analysis:	34			
14.4	Number of results rejected and not reported:	0			
	$\% \text{ Completeness} = 100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	<b>% Completeness</b>	<b>100</b>			

Note:



# DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/28/2006  
Laboratory Severn Trent Laboratory - Savannah

Project Name: Sauget Area 2 Supp. Invest.  
Project Number: 21561683.80011  
SDG No.: SAS046  
Review Level: Level III

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

Samples were qualified due to extractions outside of holding time and high/low surrogate recoveries.

Field IDs:	OSAA-1-26	OSAA-1-106	TB-7	AA-P-10-62
	OSAA-1-46	UAA-11-22	UAA-11-82	TB-8
	OSAA-1-66	UAA-11-42	UAA-11-102	AA-P-10-82
	OSAA-1-86	UAA-11-62	AA-P-10-22	AA-P-10-102
	TB-6	UAA-11-62-D	AA-P-10-42	AA-P-10-102-D
				AA-P-10-118.5

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated surrogate recovery was outside evaluation criteria for 2-fluorophenol and 2-fluorobiphenol in sample UAA-11-22 and for 2-fluorophenol, 2-fluorobiphenol, nitrobenzene-d5 and 2,4,6-tribromophenol in sample UAA-11-102. MS/MSD recoveries for 3,3-dichlorobezidine were outside evaluation criteria for sample AA-P-10-42. The grand mean exception was stated to have been applied to the initial calibration and ICV. The raw data was reviewed and the grand mean was not found to be used, all calibration met evaluation criteria.

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: Samples OSAA-1-26, OSSA-1-46 and OSAA-1-66 were extracted approximately 1-3 hours outside holding times. All analytes were non-detect in all associated samples and were qualified estimated nondetect "UJ".

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
OSAA-I-26	All SVOCs	UJ	H	680-47503	Extracted out of Hold time
OSAA-I-46	All SVOCs	UJ	H	680-47503	Extracted out of Hold time
OSAA-I-66	All SVOCs	UJ	H	680-47595	Extracted out of Hold time

### 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	x		
3.2	Have all samples been analyzed within twelve hours of the tune?	x		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note: All tuning criteria were met.

### 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blanks met criteria.

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: Initial calibration met criteria. The grand mean exception was stated to have been applied to the initial calibration and ICV. The raw data was reviewed and the grand mean was not found to be used, all calibration met evaluation criteria.

## 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	x		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note: A continuing calibration standard was not analyzed every 12 hours, although all samples were analyzed within 12 hours of a continuing calibration being analyzed. Compounds Indeno(1,2,3-cd) pyrene (33.2%) for calibration date 6/13, Indeno(1,2,3-cd) pyrene (25.7%) for calibration date 6/14, Indeno(1,2,3-cd) pyrene (39.8%), Dibenzo (a,h) anthracene (25.6%) and Benzo (g,h,i) perylene (25.3%) for calibration date 6/15. All associated analytes in samples were nondetect, therefore no qualification of data was required.

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?		x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL                      10% to LCL                      < 10%			
	Positive                      J                      J                      J			
	Non-detect                      None                      UJ                      R			

Note: Surrogate recoveries for 2-fluorophenol (53%) was outside evaluation criteria (56-100%) and 2-fluorobiphenol (56%) was outside evaluation criteria (59-103%) in sample UAA-11-22. All analytes in sample UAA-11-22 were nondetected and qualified estimated nondetect "UJ". Surrogate recoveries were outside evaluation criteria for 2-fluorophenol (101%) with criteria (56-100%), 2-fluorobiphenol (107%) with criteria (59-103%), nitrobenzene-d5 (114%) with criteria (60-102%), and 2,4,6-tribromophenol (133%) with criteria (55-126%) in sample UAA-11-102. All detected analytes were qualified estimated "J" in sample UAA-11-102.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
UAA-11-22	All nondetects	UJ	S	680-47378	Low surrogate recovery
UAA-11-102	1,4-Dichlorobenzene	J	S	680-47378	High surrogate recovery

### 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: MS/MSD recoveries for 3,3-Dichlorobezidine (18/16%) were outside evaluation criteria (29-101%) in sample AA-P-10-42, however the LCS recoveries were within QC limits; therefore, no qualification of data was required.

### 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: All LCS met criteria.

### 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	x		
	Area > +100% Positive J Non-detect None			
	Area < -50% J UJ			
	Area < -10% J R			
Note:	sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: All Internal standards met criteria.

### 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

## 12.0 TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Samples did not require a dilution.

## 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?			x
	No action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Samples UAA-11-62-D was a duplicate of UAA-11-62 and AA-P-10-102-D was a duplicate of AA-P-10-102.

## 14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	20			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

Note: All data was usable.

# DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer: Tony Sedlacek  
Date: 7/31/2006  
Laboratory Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS046  
Review Level: Level III

## Major Anomalies:

Pentachlorophenol was rejected in all herbicide samples due to zero recovery in MS/MSD sample AA-P-10-42.

## Minor Anomalies:

No other qualifications of data were required.

Field IDs:	OSAA-1-26	OSAA-1-106	TB-7	AA-P-10-62
	OSAA-1-46	UAA-11-22	UAA-11-82	TB-8
	OSAA-1-66	UAA-11-42	UAA-11-102	AA-P-10-82
	OSAA-1-86	UAA-11-62	AA-P-10-22	AA-P-10-102
	TB-6	UAA-11-62-D	AA-P-10-42	AA-P-10-102-D
				AA-P-10-118.5

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	<input checked="" type="checkbox"/>		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	<input checked="" type="checkbox"/>		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Note: The laboratory case narrative indicated MS/MSD recoveries were outside evaluation criteria for dichloroprop and pentachlorophenol in sample AA-P-10-42. The grand mean exception was applied to the continuing calibration verification standards. The rule is described in method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference of all the compounds in the CCV is less than or equal to 15%.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	<input checked="" type="checkbox"/>		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-). Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days		<input checked="" type="checkbox"/>	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		<input checked="" type="checkbox"/>	

Note: All holding times were met.

### 3. Blanks (Method Blanks and Field Blanks)

(Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All Method blanks met criteria.

### 4.0 Initial Calibration (Code r)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: Initial calibration was met.

### 5.0 Continuing Calibration (Code c)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 12 hours?	x		
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from ave CF to verify correct calculations.			x

The grand mean exception was applied to the continuing calibration verification standards. The rule is described in method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference of all the compounds in the CCV is less than or equal to 15%. The CCV was within evaluation criteria by applying the grand mean, no qualification of data was required.

Note: All surrogate recoveries met evaluation criteria.

### 6.0 Surrogate Recovery (Code s)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All surrogate recoveries met evaluation criteria.

### 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Sample AA-P-10-42 was spiked and MS recoveries for dichlorprop (152%) and RPD (48) were outside evaluation criteria (43-106%) and RPD < 40. LCS recoveries were within evaluation criteria and all analytes were non-detect, therefore no qualification of data was required. Compound 2,4-DB had a RPD of 59 which is outside evaluation criteria of < 40. The MS/MSD recoveries were within evaluation criteria, no qualification of data was required. MS/MSD recoveries for pentachlorophenol (0/0%) were outside evaluation criteria of (46-144%) and was qualified rejected "R" in sample AA-P-10-42.

Note:

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
AA-P-10-42	Pentachlorophenol	R	m	680-47277	MS/MSD recovery of < 10%

### 8.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries met evaluation criteria.

### 9.0 TCL Identification (Code w)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		

Note:

### 10.0 TCL Quantitation and Reported Detection limits (Code p)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?	x		
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		x	
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Samples did not require dilutions.



**Field Duplicate Samples (Code f)**

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Samples UAA-11-62-D was a duplicate of UAA-11-62 and AA-P-10-102-D was a duplicate of AA-P-10-102, no qualification of data was required.

**12.0 Data Completeness**

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample,		x	
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			

Note: Pentachlorophenol was rejected in all herbicide samples due to zero recovery in MS/MSD sample AA-P-10-42.

**DATA VALIDATION WORKSHEET - Level III Review**  
**Inorganic - ICP, ICP-MS, GFAA, and CVAA**

Reviewer: Tony Sedlacek  
 Date: 7/31/2006  
 Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
 Project Number: 21561683.80011  
 SDG No.: SAS046  
 Review Level: Level III

**Major Anomalies:**

No samples were rejected

**Minor Anomalies:**

Some samples required qualification due to analytes detected in continuing calibration blank, ICS concentrations less than IDL and lab duplicate RPD greater than 20% and MS recovery and MS/MSD RPD.

<b>Field IDs:</b>	OSAA-1-26	OSAA-1-106	TB-7	AA-P-10-62	AA-P-10-118.5
	OSAA-1-46	UAA-11-22	UAA-11-82	TB-8	
	OSAA-1-66	UAA-11-42	UAA-11-102	AA-P-10-82	
	OSAA-1-86	UAA-11-62	AA-P-10-22	AA-P-10-102	
	TB-6	UAA-11-62-D	AA-P-10-42	AA-P-10-102-D	

**1.0 Chain of Custody/Sample Condition/Raw Data**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X									X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X									X		
5	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?											X	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C)	X									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X									X		

Note: The laboratory case narrative indicated potassium was detected in the method blank. The MS recovery was outside of evaluation criteria for potassium. The MS/MSD recoveries for aluminum, calcium, iron, magnesium, manganese and sodium were outside evaluation criteria.

**2.0 Holding Time (Code h)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table. Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).		X									X	

Note: All samples were analyzed within holding time criteria.

### 3.0 Instrument Calibration (Code c)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	X									X		
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).										X		
3.3	Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	X									X		
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	X									X		
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).												
	Action: R(+/-) J(+)/UJ(-) J(+) R(+)	X									X		
	Mercury < 65% 65% - 79% 121% - 135% > 135%												
	Other Metals < 75% 75% - 89% 111% - 125% > 125%												

Note: Correlation coefficients were not listed for CVAA, the standards were listed in %RSD and all were within evaluation criteria.

### 4.0 Blanks (Code o - Calibration blank failure, Code p - Preparation blank failure, Code x - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	X									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	X									X		
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	X									X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	X									X		
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.	X									X		
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		X								X		

Note: Potassium was detected in the method blank, all potassium results were greater than 5X the blank value, no qualification of data was required. Beryllium was detected in the continuing calibration blanks in samples OSAA-1-46 (.00057mg/L), OSAA-1-86 (.00039mg/L), OSAA-1-106 (.00028 mg/L), AA-P-10-62 (.00041 mg/L), AA-P-10-82 (.00082 mg/L), AA-P-10-102 (.00048 mg/L), AA-10-102-D (.00039 mg/L) and AA-P-10-118.5 (.00049 mg/L).

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
OSAA-1-46	Beryllium	U	o	680-47622	Detected in CCB
OSAA-1-86	Beryllium	U	o	680-47878	Detected in CCB
OSAA-1-106	Beryllium	U	o	680-47878	Detected in CCB
AA-P-10-62	Beryllium	U	o	680-47878	Detected in CCB
AA-P-10-82	Beryllium	U	o	680-47878	Detected in CCB
AA-P-10-102	Beryllium	U	o	680-47878	Detected in CCB
AA-10-102-D	Beryllium	U	o	680-47878	Detected in CCB
AA-P-10-118.5	Beryllium	U	o	680-47878	Detected in CCB

#### 5.0 ICP Interference Check Sample (ICS) (Code n)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	x											
5.2	Are the ICS AB recoveries within 80% - 120%?	x											
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?		x										
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?	x											
Action:		Not Spiked Analytes			Spiked analytes (ICS AB analytes)								
		< -IDL			< 50%								
		> IDL			50% - 79%								
		UJ(-)			R(+/-)								
		J(+)			J(+)/UJ(-)								
					J(+)								

Note: Barium (.0022 mg/L), chromium (.0011 mg/L), manganese (.0058 mg/L), vanadium (.0027 mg/L) and zinc (.0118 mg/L) results were greater than the IDL in ICS A. All associated samples in which these analytes are detected were qualified estimated "J".

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
All metals	Barium	J	n	680-47878	ICS < IDL
All metals	Chromium	J	n	680-47878	ICS < IDL
All metals	Manganese	J	n	680-47878	ICS < IDL
All metals	Vanadium	J	n	680-47878	ICS < IDL
All metals	Zinc	J	n	680-47878	ICS < IDL

#### 6.0 Laboratory Control Sample (LCS) (Code l - Recovery, Code e - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
Action:		Solid			Aqueous								
		< LCL			< 50%								
		> UCL			50% - 79%								
		J(+)/UJ(-)			J(+)/UJ(-)								
		J(+)			J(+)								

Note: All recoveries were within QC criteria.

## 7.0 Laboratory Duplicates (Code k)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.		x								x		

Note: Sample AA-P-10-42-D was duplicated by the lab and aluminum (21.9%) had an RPD value outside evaluation criteria of <20%. Aluminum was detected in the sample and was qualified estimated "J".

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
AA-P-10-42-D	Aluminum	J	k	680-47878	Lab Dup RPD < 20%

## 8.0 Spike Sample Analysis -Pre-Digestion (Code m - Recovery, Code d - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	x									x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet. Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.		x									x	
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	x									x		
	%R > 125%      30% < %R < 74%      %R < 30%												
	Positive      J      J      J												
	Non-detect      None      UJ      R												

Note: Sample AA-P-10-42 was spiked and analyzed for metals, the MS recovery for potassium (136%) was outside evaluation criteria of 75-125% and RPD (22) was outside evaluation criteria of RPD < 20. Potassium was qualified estimated "J" in sample AA-P-10-42. MS/MSD recoveries for aluminum (136/21%), calcium (464/302%), iron (-63/-483%), magnesium (179/129%) and MS recovery for manganese (128%) in sample AA-P-10-42 were outside evaluation criteria of (75-125%). These analytes had sample results greater than 4X the spike concentration, therefore, no qualification of data was required.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
AA-P-10-42	Potassium	J	m,d	680-47878	MS recovery high and RPD

## 9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?	X									X		

Note:

## 10.0 ICP Serial Dilutions (Code s)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	X											
10.2	Was a five-fold dilution performed?	X											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	X											

Note: Samples AA-P-10-42 and UAA-11-22 were diluted and analyzed, all %Ds were within QC limits.

## 11.0 Field Duplicate Samples (Code f)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	X									X		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 35% or difference < $\pm 2 \times \text{PQL}$ and For solids, RPD < 50% or difference < $\pm 4 \times \text{PQL}$ )	X									X		

Note: Samples UAA-11-62-D was a duplicate of UAA-11-62 and AA-P-10-102-D was a duplicate of AA-P-10-102, no qualification of data was required.

## 12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			X									X
12.2	Were all dilution reflected in the positive results and detection limits?	X											X

Note: All samples were aqueous and mercury results did not require a dilution.

## 13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)												
13.2	Number of samples:	18			0			0					18
13.3	Number of target compounds in each analysis:	22			0			0					1
13.4	Number of results rejected and not reported:	0			0			0					0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$												
	% Completeness	100			###			###					100

Note:

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# DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer: Tony Sedlacek  
Date: 8/2/2006  
Laboratory: Severn Trent Laboratory - Savannah  
Test Name: Ammonia  
Method No.: 350.1

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS046  
Review Level: Level III

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:	OSAA-1-26	OSAA-1-106	TB-7	AA-P-10-62
	OSAA-1-46	UAA-11-22	UAA-11-82	TB-8
	OSAA-1-66	UAA-11-42	UAA-11-102	AA-P-10-82
	OSAA-1-86	UAA-11-62	AA-P-10-22	AA-P-10-102
	TB-6	UAA-11-62-D	AA-P-10-42	AA-P-10-102-D
				AA-P-10-118.5

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the matrix spike recovery for ammonia was outside of evaluation criteria.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: Holding times were met.

### 3.0 Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field/rinse/equipment blanks were not submitted as part of this SDG.

### 4.0 Initial Calibration (Code c)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note: All initial calibration criteria were met.

### 5.0 Continuing Calibration (Code r)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 10 samples?	x		
5.3	Do any analytes have a %R outside QC limits (80-120%)?		x	
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note: All continuing calibration criteria were met.

### 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: MS recovery for ammonia (89%) in sample AA-P-10-42 was outside evaluation criteria of (90-110%). The LCS was within evaluation criteria, therefore no qualification of data was required.



## 7.0 Laboratory Control Sample (LCS/LCSD) (Code I - LCS recovery Code c - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries within evaluation criteria.

## 8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

## 9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?	x		
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: RLs were adjusted to reflect dilutions.

## 10.0 Field Duplicate Samples (Code f)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Sample UAA-11-62-D was a duplicate of UAA-11-62 and AA-P-10-102-D was a duplicate of AA-P-10-102 and all criteria were met.

## 11.0 Laboratory Duplicates (Code k)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	x		

Note: Sample OSAA-I-26 was duplicated by the laboratory and the RPDs were within criteria.

• **Data Completeness**

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90%)				
12.2	Number of samples:	18			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness				
		100			

Note:

**SDG No:**  
**SAS047**

**DATA VALIDATION WORKSHEET  
VOLATILE ORGANIC ANALYSIS**

**Reviewer:** Tony Sedlacek  
**Date:** 8/8/2006  
**Laboratory:** Severn Trent Laboratory - Savannah

**Project Name:** Sauget - Area 2  
**Project Number:** 21561683.80011  
**SDG No.:** SAS047  
**Review Level:** Level III

**Major Anomalies:**

No samples were rejected

**Minor Anomalies:**

Sample SA2-MW-1-D were qualified due to ICAL  $r^2 < 0.990$  and CCAL % D > 20%.

**Field IDs:** SA2-MW-1-D  
 TB-9

**1.0 Chain of Custody/Sample Condition**

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: The laboratory case narrative or cooler receipt did not indicate any problems.

**2.0 Holding Time/ Preservation (Code H)**

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., $<2^\circ > 6^\circ\text{C}$ , etc.), comment in report. If unpreserved or temperature is outside the range $0^\circ$ (but not frozen) to $10^\circ$ flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds $10^\circ$ , flag positive detections "J" and non-detects			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix Preserved Aromatic All others			
	Aqueous No 7 days 14 days			
	Yes 14 days 14 days			
	Soil/Sediment $4^\circ\text{C} + 2^\circ\text{C}$ 14 days 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

**3.0 GC/MS Instrument Performance Check (Code T)**

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	x		
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	x		

Note: All tuning criteria were met.

#### 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blanks met criteria.

#### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	X		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).		X	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	X		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: Acetone (0.989) had an  $r^2$  value less than 0.990, and was qualified estimated nondetect "UJ".

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-1-D	Acetone	UJ	C	680-49126	ICAL $r^2 < 0.990$

#### 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	X		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	X		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x	X	
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		X	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note: A continuing calibration standard has not been analyzed every 12 hours, but all samples were analyzed within 12 hours of the standard being ran. Compounds 2-butanone (-29.6%), 1,1,1-trichloroethane (26.3%) and carbon tetrachloride (29.6%) had %D < 20%, and 2-butanone was qualified estimated nondetect "UJ". Compounds 1,1,1-trichloroethane and carbon tetrachloride were nondetect and did not require qualification.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-1-D	2-butanone	UJ	C	680-49126	CCAL %D > 20%

### 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			
	> UCL	10% to LCL	< 10%	
	Positive J	J	J	
	Non-detect None	UJ	R	

Note: All surrogate recoveries within evaluation criteria.

### 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample SA2-MW-1-D was spiked and analyzed for VOCs, no qualification of data was required.

### 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries within evaluation criteria.

### 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100%      Area < -50%      Area < -10%			
	Positive      J      J      J			
	Non-detect      None      UJ      R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: All internal standard area counts and retention times within evaluation criteria.

### 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note: All criteria was met.

### 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	x		
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Chlorobenzene in sample SA2-MW-1-D exceeded the linear range of the instrument and the sample was diluted 1:10 and the diluted result was within the calibration range of the instrument.

### 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicates were not submitted for VOC analysis.

### 14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	2			
14.3	Number of target compounds in each analysis:	34			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

Note:



# DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer: Tony Sedlacek  
Date: 8/9/2006  
Laboratory: Savannah Trent Laboratory - Savannah

Project Name: Sauget Area 2 Supp. Investigation  
Project Number: 21561683.80011  
SDG No.: SAS047  
Review Level: Level III

## Major Anomalies:

Compound 3,3'-Dichlorobenzidine was rejected in sample SA2-MW-1-D for low LCS recovery.

## Minor Anomalies:

Compound 3-Nitroaniline was qualified due to low LCS recovery.

Field IDs: SA2-MW-1-D

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the grand mean exception was applied to the initial calibrations, initial calibration verifications and the continuing calibration verification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation. The LCS recoveries were outside evaluation criteria for 3-nitroaniline and 3,3'-dichlorobenzidine.

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days)		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

## 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	x		
3.2	Have all samples been analyzed within twelve hours of the tune?	x		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note: All tuning criteria were met.

#### 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field equipment blanks were not submitted for analysis.

#### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: The laboratory case narrative indicated that the grand mean exception was applied to the initial calibrations and initial calibration verifications. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation. All initial calibration met criteria.

#### 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		x	
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note: A continuing calibration standard was not analyzed every 12 hours, although the samples were analyzed within 12 hours of the standards being ran. The laboratory case narrative indicated that the grand mean exception was applied to the continuing calibration verification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation, no qualification of

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	x		
7.3	Are more than one of either fraction outside the acceptance criteria?		x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			x
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL	10% to LCL	< 10%	
	Positive J	J	J	
	Non-detect None	UJ	R	

Note: All surrogates met criteria.

## 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x	x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?	x		x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: MS/MSD samples were not submitted for SVOC analysis.

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: LCS recoveries for 3-Nitroaniline (35%) was outside evaluation criteria of (46-114%) and 3,3'-Dichlorobenzidine (5%) was outside evaluation criteria of (29-101%). 3-Nitroaniline was nondetect and qualified estimated nondetect "UJ" in sample SA2-MW-1-D and 3,3'-Dichlorobenzidine was nondetect and qualified rejected "R" in sample SA2-MW-1-D.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-1-D	3-Nitroaniline	UJ	L	580-4971	LCS recovery low
SA2-MW-1-D	3,3'-Dichlorobenzidine	R	L	580-4971	LCS recovery < 10%

### 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing	x		
	Area > +100% Positive J			
	Area < -50% Non-detect None			
	Area < -10% J			
	UJ			
	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: All internal standard areas were within criteria.

### 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

### 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Samples analyzed did not require a dilution.

### 13.6 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	No action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicates were not submitted for SVOC analysis.

### 14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	x		
14.2	Number of samples:		1	
14.3	Number of target compounds in each analysis:		65	
14.4	Number of results rejected and not reported:		1	
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			
	% Completeness		98.46153846	

Note: Compound 3,3'-Dichlorobenzidine was rejected in sample SA2-MW-1-D for low LCS recovery.

# DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer: Tony Sedlacek  
Date: 8/9/2006  
Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS047  
Review Level: Level III

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

No samples required qualification in this SDG.

Field IDs: SA2-MW-1-D

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the grand mean was applied to continuing calibration verification standards. This rule is described in Method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference of all compounds in the CCV is less than or equal to 15%. The LCSD recoveries were outside

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

## 3.0 Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	x
	Action: Positive sample results $< 5X$ the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All Method blanks met criteria and field/rinse/equipment blanks were not submitted for analysis.

#### 4.0 Initial Calibration (Code r)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	x		
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: All initial calibration met criteria.

#### 5.0 Continuing Calibration (Code c)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.		x	
5.5	If Level IV, calculate a sample of CFs and %Ds from ave CF to verify correct calculations.			x

Note: A continuing calibration standard was not analyze every 12 hours, although all samples were analyzed within 12 hours of the standard being ran. The grand mean was applied to continuing calibration verification standards. This rule is described in Method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference of all compounds in the CCV is less than or equal to 15%.

#### 6.0 Surrogate Recovery (Code s)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL                      10% to LCL                      < 10%			
	Positive                      J                      J                      J			
	Non-detect                      None                      UJ                      R			

Note: All surrogate recoveries met evaluation criteria.

#### 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: An MS/MSD was not submitted for herbicide analysis.

**Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Coo. - RPD)**

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCSD recovery for Dichlorprop (109%) was outside evaluation criteria of (43-106%) and LCSD recovery for MCP (152%) was outside evaluation criteria of (27-150%). The LCS recoveries and RPDs were within evaluation criteria for both analytes, therefore, no qualification of

**9.0 TCL Identification (Code w)**

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		

Note:

**10.0 TCL Quantitation and Reported Detection limits (Code p)**

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?	x		
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Samples analyzed did not require a dilution.

**11.0 Field Duplicate Samples (Code f)**

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicates were not submitted for herbicide analysis.

**12.0 Data Completeness**

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for solids)	x		
12.2	Number of samples:		1	
12.3	Number of target compounds in each analysis:		10	
12.4	Number of results rejected and not reported:		0	
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness		100	

Note: All data was usable.



**DATA VALIDATION WORKSHEET - Level III Review**  
**Inorganic - ICP, ICP-MS, AA, and CVAA**

**Reviewer:** Tony Sedlacek  
**Date:** 8/9/2006  
**Laboratory:** Severn Trent Laboratory - Savannah

**Project Name:** Sauget - Area 2  
**Project Number:** 21561683.80011  
**SDG No.:** SAS047  
**Review Level:** Level III

**Major Anomalies:**

No samples were rejected

**Minor Anomalies:**

Samples required qualification due to sample results less than 5X the blank result and serial dilution %D > 10%.

**Field IDs:** SA2-MW-1-D

**1.0 Chain of Custody/Sample Condition/Raw Data**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

**Note:** The laboratory case narrative indicated that sodium was analyzed at a dilution in sample SA2-MW-1-D, and the associated serial dilution and post-digestion spike due to a high level of target analytes. The serial dilution was outside control limits for potassium in sample SA2-MW-1-D.

**2.0 Holding Time (Code h)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).		x									x	

**Note:** All samples met holding time criteria.

### 3.0 Instrument Calibration (Code c)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	x									x		
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	x									x		
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	x									x		
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%). Action: R(+/-) J(+)/UJ(-) J(+) R(+) Mercury < 65% 65% - 79% 121% - 135% > 135% Other Metals < 75% 75% - 89% 111% - 125% > 125%	x									x		

Note: Instrument calibration for CVAA was not listed as correlation coefficients, it was listed as %R and all %Rs were within evaluation criteria.

### 4.0 Blanks (Code o - Calibration blank failure, Code p - Preparation blank failure, Code x - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > +IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > +IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.	x										x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).	x										x	

Note: Analytes chromium (.0042 mg/L) and copper (.0034 mg/L) results were less than 5 times the continuing calibration blank values and were qualified "U" in sample SA2-MW-1-D. The lead (.0050 mg/L) result was less than 5 times the most negative value in the continuing calibration blank and qualified "UJ" in sample SA2-MW-1-D.

Field ID	Analyte(s)	Qualification	Run #	Justification
SA2-MW-1-D	Chromium	U	680-50308	ample results < 5x blank res
SA2-MW-1-D	Copper	U	680-50308	ample results < 5x blank res
SA2-MW-1-D	Lead	UJ	680-50308	ample results < 5x blank res

**5.0 ICS interference Check Sample (ICS) (Code n)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	x											
5.2	Are the ICS AB recoveries within 80% - 120%?	x											
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?		x										
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?		x										
Action:													
Not Spiked Analytes													
Spiked analytes (ICS AB analytes)													
< -IDL > IDL													
UJ(-) J(+)													
< 50% 50% - 79% > 120%													
R(+/-) J(+)/UJ(-) J(+)													

Note: Unspiked analytes cadmium (.0025 mg/L), chromium (.0018 mg/L), copper (.0019 mg/L), manganese (.0060 mg/L) and zinc (.0138 mg/L) had results in ICS A < IDL. Chromium and copper were previously qualified due to blank contamination, therefore no further qualification is required. The unspiked results in ICS A had little affect on the sample results for manganese (15 mg/L) and zinc (34mg/L) in sample SA2-MW-1-D due to the level of target analyte, therefore no qualification of data was required. The cadmium result in sample SA2-MW-1-D was already qualified "J",

**6.0 Laboratory Control Sample (LCS) (Code l - Recovery, Code e - RPD)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
Action:													
Solid													
Aqueous													
< LCL > UCL													
J(+)/UJ(-) J(+)													
< 50% 50% - 79% > 120%													
R(+/-) J(+)/UJ(-) J(+)													

Note: All recoveries met evaluation criteria.

**7.0 Laboratory Duplicates (Code k)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.			x									x
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x									x
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < + PQL for aqueous, and RPD < 35% or difference < + 2 X PQL for solids)? Action: If no, J(+).			x									x
Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.													

Note: The laboratory did not duplicate any samples that were part of this SDG, the samples duplicated were from another client.

# 8.0 Sample Analysis -Pre-Digestion (Code m - Recovery, Code d - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.			x									x
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x									x
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.												
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)			x									x
	%R > 125%      30% < %R < 74%      %R < 30%												
	Positive J												
	Non-detect None												

Note: Samples spiked analyzed were from another client.

# 9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?	x									x		

Note:

# 10.0 ICP Serial Dilutions (Code s)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).		x										

Note: Sample SA2-MW-1-D was diluted and analyzed, and potassium (13.5%) was outside evaluation criteria of < 10%. Potassium was qualified estimated "J" in sample SA2-MW-1-D.

Field ID	Analyte(s)	Qualification	Run #	Justification
SA2-MW-1-D	Potassium	J	680-50308	serial dilution result %D > 10%

# 11.0 Field Duplicate Samples (Code f)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 35% or difference < $\pm 2 \times$ PQL and For solids, RPD < 50% or difference < $\pm 4 \times$ PQL)			x									x

Note: Field duplicates were not submitted for metals analysis.

## 12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?	x											x

Note: The matrix of samples analyzed was aqueous, no samples submitted were solid-matrix.

## 13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)												
13.2	Number of samples:	1			0			0			1		
13.3	Number of target compounds in each analysis:	22			0			0			1		
13.4	Number of results rejected and not reported:	0			0			0			0		
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$												
	% Completeness	100			###			###			100		

Note: All data was usable.

# DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer: Tony Sedlacek  
Date: 8/9/2006  
Laboratory: Severn Trent Laboratory - Savannah  
Test Name: Dissolved Gasses, chloride, ammonia, nitrate/nitrite, sulfate, Total  
Method No.: RSK 175, 325.2, 353.3, 375.4, 415.1, 310.1

Project Name: Sauget - Area 2 Supp. Invest.  
Project Number: 21561683.80011  
SDG No.: SAS047  
Review Level: Level III

## Major Anomalies:

Nitrate and nitrite were qualified rejected "R" due to being analyzed outside of holding time.

## Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: SA2-MW-1-D

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: The laboratory case narrative indicated the methane results exceeded the upper calibration range of the flame ionization detector in sample SA2-MW-1-D so the results were reported from the thermal conductivity detector. Nitrite was analyzed outside of holding time, due to analyst error.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Nitrite was analyzed outside holding time by approximately 8 days. The laboratory case narrative failed to mention that nitrate was also analyzed outside of holding time by approximately 8 days. The results were both nondetect and nitrate was qualified estimated nondetect "UJ" and nitrite was qualified rejected R in sample SA2-MW-1-D.

Field ID	Analyte(s)	Qualification	Cd	Run #	Justification
SA2-MW-1-D	Nitrate	UJ		680-50014	analyzed outside hold time
SA2-MW-1-D	Nitrite	R		680-50014	analyzed outside hold time

### 3. Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?		x	
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: There was not a method blank associated with batch 680-49626. Field/rinse/equipment blanks were not submitted for analysis.

### 4.0 Initial Calibration (Code c)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note: All initial calibration were within evaluation criteria.

### 5.0 Continuing Calibration (Code r)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 10 samples?	x		
5.3	Do any analytes have a %R outside QC limits (80-120%)?		x	
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			x

Note: All continuing calibrations were within evaluation criteria.

### 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: MS/MSD samples were not submitted for analysis.

Laboratory Control Sample (LCS/LCSD) (Code I - LCS recovery Code RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries within evaluation criteria.

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?	x		

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?	x		
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		x	
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	x		
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: The methane results exceeded the upper calibration range of the FID detector in sample SA2-MW-1-D so the results were reported from the TCD detector.

10.0 Field Duplicate Samples (Code f)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicates were not submitted for analysis.



### Laboratory Duplicates (Code k)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm 2 \times$ PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

Note: The laboratory did not duplicate any samples for analysis.

### 12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90%		x	
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			

Note: Data was rejected due to holding time violation.

**SDG No:**  
**SAS048**

# DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer: Steve Gragert  
Date: 8/22/2006  
Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS048  
Review Level: Level IV

## Major Anomalies:

No samples were rejected

## Minor Anomalies:

Analytes were qualified J/UJ due to CCAL %Ds > 20%.

Field IDs:	SA2-MW-4-D	SA2-MW-1-M	SA2-MW-1-M-D
	SA2-MW-1-S	TB-10	SA2-MW-2-M
	TB-11	SA2-MW-2-D	TB-12
	SA2-MW-2-S	SA2-MW-8-D	SA2-MW-4-M
	SA2-MW-4-S	SA2-MW-3M-FB	SA2-MW-10M-FB
	SA2-MW-3-M	SA2-MW-3-S	SA2-MW-3-S-D
	SA2-MW-3-D	SA2-MW-10M	SA2-MW-10D
	SA2-MW-10-S		

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated an LCS RPD outside of evaluation criteria for Bromomethane and MS/MSD recoveries outside of evaluation criteria for Chlorobenzene and Bromomethane.

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix Preserved Aromatic All others			
	Aqueous No 7 days 14 days			
	Yes 14 days 14 days			
	Soil/Sediment 4 °C ± 2 °C 14 days 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

### 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	x		
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	x		

Note: All tuning criteria were met.

### 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: Trip blanks TB-10, TB-11 and TB-12 had positive results for toluene (0.87J, 0.68J and 1.1). All samples associated with these trip blanks were either non-detect for toluene or greater than 5X the associated blank contamination, therefore, no qualification of data was required. The review of chromatograms indicates all peaks present were accounted or the concentrations reported were below the method detection

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	x		

Note: Initial calibration was within evaluation criteria. Recalculations of the RRFs and %RSD were performed, and no errors in calculation were noted.

# Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	x		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.	x		

Note: A continuing calibration standard was not analyzed every 12 hours, although all samples were analyzed within 12 hours after a standard was analyzed. The CCV analyzed on 7/11/2006, AQ760, had 2-Butanone %D of -21.3%, all associated data were nondetect. The CCV analyzed on 7/12/2006, AQ768, had the following analytes %D>20%: Bromomethane (-21.7%), Carbon disulfide (20.5%), 2-Butanone (-21.0%), and 4-Methyl-2-Pentanone (-20.2%). The CCV analyzed on 7/13/2006, AQ776, had the following analytes %D>20%: Bromomethane (31.2%), 2-Butanone (-22.6%), 4-Methyl-2-pentanone (-25.2%). The following table indicates qualifiers based on CCV %D>20%. Recalculations of the RF and %D for one compound per standard were completed, and no errors in calculation were noted.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-4-D	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-1-M	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-1-M-D	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-1-S	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-2-M	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-2-D	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-2-D	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-2-D	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-2-S	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-2-S	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-2-S	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-8-D	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-8-D	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-8-D	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-4-M	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-4-M	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-4-M	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-4-S	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-4-S	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-4-S	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-M	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-M	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-M	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-S	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-S	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-S	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-S-D	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-S-D	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-S-D	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-D	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-D	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-3-D	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-10M	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-10M	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-10M	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-10D	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-10D	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-10D	Bromomethane	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-10S	2-Butanone	UJ	C	680-18156	CCAL %D > 20%
SA2-MW-10S	4-Methyl-2-Pentanone	UJ	C	680-18156	CCAL %D > 20%

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted			
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All surrogate recoveries were within evaluation criteria.

## 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA2-MW-2-D and SA2-MW-10S were spiked and analyzed for VOCs. Chlorobenzene had MS/MSD recoveries (133 and 64, RPD = 21) which were outside of evaluation criteria (75-123/30). Bromomethane had a MSD recovery (143 and 190, RPD=28) which were outside of evaluation criteria (21-176, RPD=50). Since the LCS was within evaluation criteria, no qualification of data based on MS/MSD recoveries was required.

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.	x		
	Action for specific compound outside the acceptance criteria: %R>UCL,			

Note: LCS 680-49559/2 had Bromomethane recoveries of 115% and 67% (RPD = 52). Bromomethane's recovery evaluation criteria is 21-176% (RPD<50). Since both recoveries were within evaluation criteria, no qualification of data is required. Ten percent of the spiking compound recoveries for the LCS were recalculated using the LCS summary form, and no calculation or transcription errors were noted.

## 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100% Area < -50% Area < -10%			
	Positive J J J			
	Non-detect None UJ R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		

	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			
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Note: All internal standard areas met criteria.

#### 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample	x		

Note:



**J TCL/TIC Quantitation and Reported Detection limits (Code K)**

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	x		

Note: For the validation of compound quantitation, ten percent of the detected results were recalculated from the raw data, and no calculation errors were noted.

**13.0 Field Duplicate Samples (Code F)**

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should			

Note: No field duplicates were submitted for VOC analysis.

**14.0 Data Completeness**

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous	x		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$			
	% Completeness			

Note:

# DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer: Steve Gragert  
Date: 8/23/2006  
Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget Area 2 Supp. Investigation  
Project Number: 21561683.80011  
SDG No.: SAS048  
Review Level: Level IV

## Major Anomalies:

No samples were rejected.

## Minor Anomalies:

No samples required qualification.

Field IDs: SA2-MW-4-D SA2-MW-1-M SA2-MW-1-M-D  
SA2-MW-1-S SA2-MW-10D SA2-MW-2-M  
SA2-MW-10-S SA2-MW-2-D SA2-MW-10M  
SA2-MW-2-S SA2-MW-8-D SA2-MW-4-M  
SA2-MW-4-S SA2-MW-3M-FB SA2-MW-10M-FB  
SA2-MW-3-M SA2-MW-3-S SA2-MW-3-S-D  
SA2-MW-3-D

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the grand mean exception was applied to the initial calibrations, initial calibration verifications and the continuing calibration verification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation. Due to the level of dilution required, several surrogates were diluted out. Several MS/MSD recoveries were outside of evaluation criteria due to high levels of analytes in the parent sample.

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days)		x	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

### 3.0 GC Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	x		
3.2	Have all samples been analyzed within twelve hours of the tune?	x		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note: All tuning criteria were met.

### 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: The method blank and field blank (SA2-MW-3M-FB) were nondetect for all analytes. Review of chromatograms indicates all peaks present were accounted for or the concentrations reported were below the method detection limit.

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	x		

Note: The laboratory case narrative indicated that the grand mean exception was applied to the initial calibrations and initial calibration verification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation. All initial calibration met criteria. Recalculations of the RRFs and %RSD for four compounds per standard were performed, and no errors

## 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		x	
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.	x		

Note: A continuing calibration standard was not analyzed every 12 hours, although the samples were analyzed within 12 hours of the standards being ran. The laboratory case narrative indicated that the grand mean exception was applied to the continuing calibration verification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation. Recalculation of the RF and %D for one compound per standard was completed, and no errors in calculation were noted.

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?	x		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?		x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL                      10% to LCL                      < 10%			
	Positive                      J                      J                      J			
	Non-detect                      None                      UJ                      R			

Note: Samples SA2-MW-4-DDL and SA2-MW-2-DDL had low recoveries for 2-Fluorobiphenyl, Nitrobenzene-d5, and Terphenyl-d14 due to high dilutions. No qualification of data was required.

## 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA2-MW-10S and SA2-MW-4-D were spiked and analyzed for SVOCs. Various analytes were outside of evaluation criteria for both samples due to high levels in parent sample. No qualification of data required.

**9.0 Lab. Library Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)**

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.	x		

Note: All LCS recoveries were within evaluation criteria. Ten percent of the spiking compound recoveries for the LCS were recalculated using the LCS summary form, and no calculation or transcription errors were noted.

**10.0 Internal Standards (Code I)**

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing	x		
	Area > +100%      Area < -50%      Area < -10%			
	Positive      J      J      J			
	Non-detect      None      UJ      R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: All internal standard areas were within criteria.

### 11.0 Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

### 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	x		

Note: For the validation of compound quantitation, approximately ten percent of the detected compound results were recalculated from the raw data, and no calculation errors were noted.

### 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x	x	
13.2	Were all RPD or absolute difference values within the control limits?			x
	No action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicates were not submitted for SVOC analysis.

### 14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	x		
14.2	Number of samples:		22	
14.3	Number of target compounds in each analysis:		65	
14.4	Number of results rejected and not reported:		0	
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			
	% Completeness		100	

Note:

# DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer: Steve Gragert  
Date: 8/24/2006  
Laboratory Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS048  
Review Level: Level IV

## Major Anomalies:

Pentachlorophenol was rejected in SA2-MW-10S due to zero recovery.

## Minor Anomalies:

No other qualifications of data were required.

Field IDs: SA2-MW-4-D SA2-MW-1-M SA2-MW-1-M-D  
SA2-MW-1-S SA2-MW-10D SA2-MW-2-M  
SA2-MW-10-S SA2-MW-2-D SA2-MW-10M  
SA2-MW-2-S SA2-MW-8-D SA2-MW-4-M  
SA2-MW-4-S SA2-MW-3M-FB SA2-MW-10M-FB  
SA2-MW-3-M SA2-MW-3-S SA2-MW-3-S-D  
SA2-MW-3-D

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the grand mean exception was applied to the continuing calibration verification standards. The rule is described in method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference of all the compounds in the CCV is less than or equal to 15%. MS/MSD recoveries were outside evaluation criteria for dichloroprop, 2,4-DB and pentachlorophenol. This will be discussed in the appropriate section below.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

### 3.0 Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: All method and field blanks (SA2-MW-3M-FB and SA2-MW-10M-FB) met criteria. Review of chromatograms indicated that other than surrogates, no peak positively identified above the method detection limit on either analytical column for herbicides. No data qualifications were required based on blank sample.

### 4.0 Initial Calibration (Code r)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	x		

Note: Initial calibration was met. A minimum of 10 percent of the calibration curves was recalculated and no transcription or calculation errors were noted.

### 5.0 Continuing Calibration (Code c)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 12 hours?	x		
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from ave CF to verify correct calculations.	x		

Note: The grand mean exception was applied to the continuing calibration verification standards. The rule is described in method SW-846 and states that when on more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference of all the compounds is less than or equal to 15%. The CCV was within evaluation criteria by applying the grand mean, no qualification of data was required. Additionally, a minimum ten percent of the herbicide calibration percent drifts was recalculated from the raw data, for both columns, and no transcription or calculation errors were noted.

### 6.0 Surrogate Recovery (Code s)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All surrogate recoveries met evaluation criteria.



### 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA2-MW-2-D and SA2-MW-10S were spiked and analyzed. SA2-MW-2-D had a recovery of Pentachlorophenol (38,42/12) outside of evaluation (46-144/40). SA2-MW-10S had MS/MSD recoveries of 2,4-DB (168,135/21), LCS recoveries were within evaluation criteria; therefore, no qualification outside of evaluation criteria for 2,4-DB (35-140/40) and Pentachlorophenol (0,0/NC) outside of evaluation criteria Pentachlorophenol (46-144/40). Pentachlorophenol results for SA2-MW-10S were qualified "R" since there was zero recovery.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-10S	Pentachlorophenol	R	m	680-18156	MS/MSD recovery of < 10%

### 8.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries met evaluation criteria. A minimum of ten percent of the LCS recoveries was recalculated, and no calculation or transcription errors were noted.

### 9.0 TCL Identification (Code w)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		

Note:

### 10.0 TCL Quantitation and Reported Detection limits (Code p)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?	x		
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
10.4	If Level IV, calculate a sample of positive results to verify correct calculations	x		

Note: Samples did not require dilutions. Approximately 10 percent of the sample results were recalculated and no calculations or transcription errors were noted.

**11.0 Field Duplicate Samples (Code f)**

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		x	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: No field duplicates were analyzed as part of this SDG.

**12.0 Data Completeness**

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample,		x	
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			

Note: Pentachlorophenol was rejected in herbicide sample SA2-MW-10S.

**DATA VALIDATION WORKSHEET  
PESTICIDES/PCBs ANALYSIS**

**Reviewer:** Steve Gragert  
**Date:** 8/23/2006  
**Laboratory:** Severn Trent Laboratory - Savannah

**Project Name:** Sauget - Area 2  
**Project Number:** 21561683.80011  
**SDG No.:** SAS048  
**Review Level:** Level IV

**Major Anomalies:**

No samples were rejected.

**Minor Anomalies:**

Qualifications were made on SA2-MW-4-D, due to low surrogate recoveries and low internal standard recoveries.

**Field IDs:**

SA2-MW-4-D

**1.0 Chain of Custody/Sample Condition**

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

**Note:** For Pesticides, the laboratory case narrative indicated that the surrogate recovery for Decachlorobiphenyl was outside QC limits for SA2-MW-4-D. The laboratory case narrative indicated that the grand mean exception was applied to the initial calibrations, initial calibration verifications and the continuing calibration verification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation.

For PCBs, the laboratory case narrative indicated Internal Standard recovery for the SA2-MW-4-D (97926) was below the area lower limit (115094) for the internal standard Chrysene-d12. All analytes for SA2-MW-4-D were nondetect; therefore, they were qualified UJ. No other issues were noted in either case narrative.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-4-D	All PCBs	UJ	i	680-18156	Low IS Recovery

**2.0 Holding Time/ Preservation (Code h)**

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

**Note:** All holding times were met.

### 3.0 Blank (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, e z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: Review of chromatograms indicate all peaks present were accounted or the concentrations reported were below the method detection limit.

### 4.0 GC/ECD Instrument Performance Check (Code b)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?	x		
4.2	Have all samples been analyzed within twelve hours of the performance check sample?	x		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria < (15%) for endrin and 4,4'-DDT been met?	x		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

### 5.0 Initial Calibration (Code r)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	x		

Note: Initial calibration met criteria and recalculations of the RFs and %RSD for four compounds per standard were performed, and no errors in calculation were noted.

### 6.0 Continuing Calibration (Code c)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?	x		
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.	x		

Note: The grand mean exception was applied to continuing calibration verification standards in this package. The rule is described in Method SW-846 and states that when on or more compounds fails to meet acceptance criteria, the initial calibration (ICAL) may be used for quantitation if the average percent difference (%D) of all the compounds in the CCV is less than or equal to 15%. A calculation of the %D for each target compound and a calculation of the grand mean for specific CCVs was performed. All grand mean calculations were less than 15% therefore, no qualification of data was required. Recalculation of the RF and %D for one compound per standard was completed, and no errors in calculation were noted.

## 7.0 Surrogate Recovery (Code s)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?		x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: For Pesticides, the surrogate Decachlorobiphenyl was outside QC limits in sample SA2-MW-4-D. All analytes in SA2-MW-4-D were non-detect and did not require dilutions. All non-detects in SA2-MW-4-D were qualified estimated non-detect "UJ". All PCB surrogates were within evaluation criteria.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-4-D	All Pesticides	UJ	s	680-18156	Low surrogate recover

## 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?			x
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: No MS/MSDs were requested for this data package.

## 9.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: LCS recoveries met criteria and ten percent of the spiking compound recoveries for the LCS were recalculated using the LCS summary form, and no calculation or transcription errors were noted.

### 10.0 TCL Identification (Code w)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		

Note:

### 11.0 TCL Quantitation and Reported Detection limits (Code p)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?	x		
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
11.4	If Level IV, calculate a sample of positive results to verify correct calculations	x		

Note: No dilutions were required, all analytes were non-detected. For the validation of compound quantitation, approximately ten percent of the detected compound results were recalculated from the raw data, and no calculation errors were noted. Review of the data indicated sample results were adjusted for moisture content, and the correct reporting limits were reported.

### 12.0 Field Duplicate Samples (Code f)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x	x	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x	x	
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: No field duplicates were analyzed as part of this SDG.

### 13.0 Data Completeness

		Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for	x		
13.2	Number of samples:		1	
13.3	Number of target compounds in each analysis:		21	
13.4	Number of results rejected and not reported:		0	
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			
	% Completeness		100	

Note:

**DATA VALIDATION WORKSHEET - Level III Review**  
**Inorganic - ICP, ICP-MS, AA, and CVAA**

Reviewer: Steve Gragert  
 Date: 8/23/2006  
 Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
 Project Number: 21561683.80011  
 SDG No.: SAS048  
 Review Level: Level IV

**Major Anomalies:**

No samples were rejected

**Minor Anomalies:**

Samples required qualification due to sample results less than 5X the blank result.

Field IDs:	SA2-MW-4-D	SA2-MW-1-M	SA2-MW-1-M-D
	SA2-MW-1-S	SA2-MW-10D	SA2-MW-2-M
	SA2-MW-10-S	SA2-MW-2-D	SA2-MW-10M
	SA2-MW-2-S	SA2-MW-8-D	SA2-MW-4-M
	SA2-MW-4-S	SA2-MW-3M-FB	SA2-MW-10M-FB
	SA2-MW-3-M	SA2-MW-3-S	SA2-MW-3-S-D
	SA2-MW-3-D		

**1.0 Chain of Custody/Sample Condition/Raw Data**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 0 °C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that MS/MSD samples, SA2-MW-2-D and SA2-MW-10S were analyzed at a dilution due to high levels of analytes (potassium in the parent sample. The MS/MSD for calcium, potassium, sodium, and iron were outside control limits. No qualification of data was required.

**2.0 Holding Time (Code h)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table. Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).		x									x	

Note: All samples met holding time criteria.

Instrument Calibration (Code c)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	x									x		
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	x									x		
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	x									x		
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%). Action: Mercury R(+/-) < 65% J(+)/UJ(-) 65% - 79% J(+) 121% - 135% R(+) > 135% Other Metals < 75% 75% - 89% 111% - 125% > 125%	x									x		

Note: Instrument calibration for CVAA was not listed as correlation coefficients, it was listed as %R and all %Rs were within evaluation criteria.

4.0 Blanks (Code o - Calibration blank failure, Code p - Preparation blank failure, Code x - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.	x										x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action: If yes, J(+)/UJ(-).		x									x	

Note: Analytes chromium (.0015 mg/L) and copper (0.0022 mg/L) results that were less than 5 times the continuing calibration blank values and were qualified "U."

Field ID	Analyte(s)	Qualification	Run #	Justification
SA2-MW-1-M	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-1-M-D	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-1-S	Copper	U	680-18156	<5X CCB contamination
SA2-MW-2-M	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-2-S	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-2-S	Copper	U	680-18156	<5X CCB contamination
SA2-MW-8-D	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-4-M	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-4-S	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-3-M	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-3-S	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-3-S	Copper	U	680-18156	<5X CCB contamination
SA2-MW-3-S-D	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-3-S-D	Copper	U	680-18156	<5X CCB contamination
SA2-MW-10M	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-10D	Chromium	U	680-18156	<5X CCB contamination
SA2-MW-10S	Copper	U	680-18156	<5X CCB contamination
SA2-MW-10S	Chromium	U	680-18156	<5X CCB contamination



**ICP Interference Check Sample (ICS) (Code n)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	X											
5.2	Are the ICS AB recoveries within 80% - 120%?	X											
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?	X											
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS? Action: Not Spiked Analytes      Spiked analytes (ICS AB analytes) < -IDL      > IDL      < 50%      50% - 79%      > 120% UJ(-)      J(+)      R(+/-)      J(+)/UJ(-)      J(+)												

Note:

**6.0 Laboratory Control Sample (LCS) (Code l - Recovery, Code e - RPD)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X											
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb, Solid limits: as per EPA-EMSL/LV) Action: Solid      Aqueous < LCL      > UCL      < 50%      50% - 79%      > 120% J(+)/UJ(-)      J(+)      R(+/-)      J(+)/UJ(-)      J(+)		X									X	

Note: All recoveries met evaluation criteria.

**7.0 Laboratory Duplicates (Code k)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	X											
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X									X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm 2$ X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			X									X

Note: The laboratory duplicated SA2-MW-10S and SA2-MW-2-D for both ICP and CVAA. All RPDs were within evaluation criteria.

**8.0 Spike Sample Analysis -Pre-Digestion (Code m - Recovery, Code d - RPD)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	X											
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet. Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.		X									X	
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.) %R > 125%      30% < %R < 74%      %R < 30% Positive      J      J      J Non-detect      None      UJ      R												

Note: Samples SA2-MW-10S and SA2-MW-2-D were spiked and analyzed. All recoveries were within evaluation criteria.

**Instrument Detection Limits (IDL)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?	x									x		

Note:

**10.0 ICP Serial Dilutions (Code s)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note: Sample SA2-MW-4-D was diluted and analyzed. All %Ds were within evaluation criteria.

**11.0 Field Duplicate Samples (Code f)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		x									x	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 35% or difference < ± 2 x PQL and For solids, RPD < 50% or difference < ± 4 x PQL)			x									x

Note: Field duplicates were not submitted for metals analysis.

**12.0 Result Verification (Code Q)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?	x											x

Note: The matrix of samples analyzed was aqueous, no samples submitted were solid-matrix.

**13.0 Data Completeness**

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)												
13.2	Number of samples:	19			0			0			19		
13.3	Number of target compounds in each analysis:	22			0			0			1		
13.4	Number of results rejected and not reported:	0			0			0			0		
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$												
	% Completeness	100			0			0			100		

Note: All data was usable.

# DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer: Steve Gragert  
Date: 8/24/2006  
Laboratory: Severn Trent Laboratory - Savannah  
Test Name: Dissolved Gasses, chloride, ammonia, nitrate/nitrite, sulfate, Total  
Method No.: RSK 175, 325.2, 353.3, 375.4, 415.1, 310.1

Project Name: Sauget - Area 2 Supp. Invest.  
Project Number: 21561683.80011  
SDG No.: SAS048  
Review Level: Level IV

## Major Anomalies:

No samples were rejected, all data was useable.

## Minor Anomalies:

Samples were qualified do to field blank contamination.

Field IDs:	SA2-MW-4-D	SA2-MW-1-M	SA2-MW-1-M-D
	SA2-MW-1-S	SA2-MW-10D	SA2-MW-2-M
	SA2-MW-10-S	SA2-MW-2-D	SA2-MW-10M
	SA2-MW-2-S	SA2-MW-8-D	SA2-MW-4-M
	SA2-MW-4-S	SA2-MW-3M-FB	SA2-MW-10M-FB
	SA2-MW-3-M	SA2-MW-3-S	SA2-MW-3-S-D
	SA2-MW-3-D		

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition	x		

Note: The laboratory case narrative indicated the MS/MSD recoveries for Chloride and Ammonia were outside of evaluation criteria due to abundance of analyte present in the parent sample. The case narrative indicates Nitrite was analyzed outside of holding time for the field blanks SA2-MW-3M-FB and SA2-MW-10M-FB, due to analyst error. The COC requests Ammonia as the only analysis ran for wet chemistry analysis. The laboratory case narrative indicated the methane results exceeded the upper calibration range of the flame ionization detector in 7 samples; therefore, the results were reported from the thermal conductivity detector.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached	x		
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Nitrite was analyzed outside holding time by approximately 11 days. The laboratory case narrative failed to mention that nitrate was also analyzed outside of holding time by approximately 11 days. Both samples were field blanks; therefore, no qualification of data were required.

### 3.0 Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?	x		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: Field blank SA2-MW-3M-FB had detections of ammonia (0.060mg/L) and TOC (0.52mg/L). The TOC result for the parent sample SA2-MW-3-M was qualified "U" due to field blank contamination. Field blank SA2-MW-10M-FB had detections of ammonia (0.052mg/L), Sulfate (94mg/L) and TOC (1.5mg/L). All results for the parent sample were >5X the associated blank concentration; therefore, no qualification of data was required. Raw data was

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-3-M	TOC	UJ	x	680-50475	Field Blank contamination

### 4.0 Initial Calibration (Code c)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.	x		

Note: All initial calibration were within evaluation criteria. Approximately 50 percent of the initial calibration and ICV recoveries were recalculated and compared to the raw data; no calculation or transcription errors were noted.

### 5.0 Continuing Calibration (Code r)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 10 samples?	x		
5.3	Do any analytes have a %R outside QC limits (80-120%)?		x	
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R <			
5.4	If Level IV, calculate a sample of %Rs.	x		

Note: All continuing calibrations were within evaluation criteria. Approximately 10 percent of the CV sample recoveries were recalculated and compared to the raw data. No calculation or transcription errors were noted.

### 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with			

Note: Samples SA2-MW-10S and SA2-MW-2-M were spiked and analyzed. For sample SA2-MW-10S, Ammonia recoveries (79,79/0) and Sulfate recoveries (150,148/1) were outside of evaluation criteria for Ammonia (90-10/30) and Sulfate (75-125/30). For sample SA2-MW-2-M, Ammonia recoveries (83,80/1) also outside of evaluation criteria (90-110/30). Since all LCS results were within evaluation criteria, no qualification of data was required.

7.0 Laboratory Control Sample (LCS/LCSD) (Code I - LCS recovery Code e - RPD,

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.	x		
	Action for specific compound outside the acceptance criteria: %R>UCL,			

Note: All LCS recoveries within evaluation criteria. A minimum of ten percent of LCS/SRM recoveries were recalculated and compared to the raw data; no calculation or transcription errors were noted.

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?	x		

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?	x		
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	x		
9.4	If Level IV, calculate a sample of positive results to verify correct calculations	x		

Note: The methane results exceeded the upper calibration range of the FID detector in sample SA2-MW-1-D so the results were reported from the TCD detector. A minimum of ten percent of the validated sample results was recalculated to validate that analyte quantitation was derived accurately, and no calculation

### 10.0 Field Duplicate Samples (Code f)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		x	
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: No field duplicates were submitted for analysis.

### 11.0 Laboratory Duplicates (Code k)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD			x

Note: The laboratory did not duplicate any samples for analysis.

### 12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90%		x	
12.2	Number of samples:			19
12.3	Number of target compounds in each analysis:			10
12.4	Number of results rejected and not reported:			3
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			98.42105263

Note:

**SDG No:**  
**SAS049**

**DATA VALIDATION WORKSHEET  
VOLATILE ORGANIC ANALYSIS**

Reviewer: Steve Gragert  
Date: 8/24/2006  
Laboratory Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS049  
Review Level: Level III

**Major Anomalies:**

No samples were rejected

**Minor Anomalies:**

One sample was qualified "J" based on elevated LCS recovery. Twelve samples were qualified "UJ" due to CCV %Ds > 20%.

Field IDs:	TB-13	SA2-MW-6-M	SA2-MW-6-M-Dup
	SA2-MW-6-M-D	SA2-MW-5-D	SA2-MW-5-M
	TB-14	SA2-MW-9-S	SA2-MW-9-D
	SA2-MW-9-D-D	SA2-MW-9-M	SA2-MW-9-S
	SA2-MW-9-S	SA2-MW-7-M-FB	SA2-MW-7-M
	SA2-MW-7-D	TB-15	

**1.0 Chain of Custody/Sample Condition**

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt,	x		

Note: The laboratory case narrative indicates LCS recoveries outside of evaluation criteria for carbon disulfide and chloromethane. The MS/MSD that was spiked and analyzed for VOCs had recoveries outside of evaluation criteria for Chloromethane and Vinyl chloride. These issues will be discussed in the appropriate sections below.

**2.0 Holding Time/ Preservation (Code H)**

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix Preserved Aromatic All others			
	Aqueous No 7 days 14 days			
	Yes 14 days 14 days			
	Soil/Sediment 4 °C + 2 °C 14 days 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note:

**3.0 GC/MS Instrument Performance Check (Code T)**

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	x		
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	x		

Note: All tuning criteria was met.



#### 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field blank SA2-MW-7-FB had a detection of Toluene (1.9 µg/L). The parent sample was nondetect for toluene; therefore, no qualification of data was required.

#### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01)		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: Initial calibration was within evaluation criteria.

#### 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	x		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+); only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note: A continuing calibration standard was not analyzed every 12 hours, although all samples were analyzed within 12 hours after a standard was analyzed. CCV 10071706C2MB had Bromomethane (-25.2%) %Ds >20%.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-6-M	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-6-M-Dur	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-6-D	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-9-D	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-9-D-D	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-9-M	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-9-S	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-5-D	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-5-S	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-5-M	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-7-M	Bromomethane	UJ	C	680-18316	CCV %D >20%
SA2-MW-7-D	Bromomethane	UJ	C	680-18316	CCV %D >20%

## 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All recoveries were within evaluation criteria.

## 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+)			

Note: The trip blank TB-13 was analyzed as the MS/MSD. Chloromethane (142,143/1) and Vinyl chloride (143, 134/6) recoveries were above evaluation criteria for Chloromethane (51-133/50) and Vinyl chloride (59-136/50). Since the trip blank was used as the MS/MSD, no qualification of data was required.

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: LCS 680-50107/3 had a Carbon disulfide recovery (133%) outside of evaluation criteria (60-130). Associated data requiring qualification table below. LCSD 680-50333/7 had a Chloromethane recovery (135) outside of evaluation criteria. Since the LCS was within evaluation criteria, no qualification of data was required.

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-9-S	Carbon disulfide	J	L	680-18316	High LCS Recovery

### 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100%      Area < -50%      Area < -10%			
	Positive J      J      J			
	Non-detect None      UJ      R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: The internal standard chlorobenzene-d5 had an area that was below the lower limit for sample NAPL-C-139, the sample was reanalyzed and the area was also below the lower limit. Sample was previously qualified due to surrogate recoveries, no qualifications of data were required.

### 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

### 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

### 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should			

Note: Sample SA2-MW-6-M-Dup was the field duplicate of SA2-MW-6-M.

### 14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous	x		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$			
	% Completeness			

Note:

# **DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS**

**Reviewer:** Steve Gragert  
**Date:** 8/25/2006  
**Laboratory** Severn Trent Laboratory - Savannah

**Project Name:** Sauget Area 2 Supp. Investigation  
**Project Number:** 21561683.80011  
**SDG No.:** SAS049  
**Review Level:** Level III

**Major Anomalies:**

No samples were rejected.

**Minor Anomalies:**

No samples required qualification.

**Field IDs:**

SA2-MW-7-D	SA2-MW-6-M	SA2-MW-6-M-Dup
SA2-MW-6-M-D	SA2-MW-5-D	SA2-MW-5-M
SA2-MW-7-M	SA2-MW-9-S	SA2-MW-9-D
SA2-MW-9-D-D	SA2-MW-9-M	SA2-MW-9-S
SA2-MW-9-S	SA2-MW-7-M-FB	

**1.0 Chain of Custody/Sample Condition**

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	<b>x</b>		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	<b>x</b>		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	<b>x</b>		

Note: The laboratory case narrative indicated that the grand mean exception was applied to the initial calibrations, initial calibration verifications and the continuing calibration verification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation. The surrogate Phenol-d5 was outside of evaluation criteria in SA2-MW-5-S. LCS recoveries for 1,4-Dichlorobenzene and Hexachloroethane were outside evaluation criteria. An internal standard were outside of evaluation criteria, in the field blank SA2-MW-7-M-FB. These issues will be addressed in the appropriate section below.

**2.0 Holding Time/ Preservation (Code H)**

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	<b>x</b>		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days		<b>x</b>	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		<b>x</b>	

Note: All holding times were met.

### GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	x		
3.2	Have all samples been analyzed within twelve hours of the tune?	x		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?	x		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note: All tuning criteria were met.

### 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The method blank and field blank (SA2-MW-7-M-FB) were nondetect for all analytes.

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: The laboratory case narrative indicated that the grand mean exception was applied to the initial calibrations, initial calibration verifications and the continuing calibration verification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used for quantitation. All initial calibration met criteria.

### Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?		x	
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		x	
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note: A continuing calibration standard was not analyzed every 12 hours, although the samples were analyzed within 12 hours of the standards bverification. The rule is described in Method SW-846 and states when one or more compounds fail to meet acceptance criteria the initial calibration may be used foreing ran. The laboratory case narrative indicated that the grand mean exception was applied to the initial calibrations, initial calibration verifications and the continuing calibration quantitation.

### 7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction outside the acceptance criteria?		x	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?		x	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?		x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
	> UCL                      10% to LCL                      < 10%			
	Positive                      J                      J                      J			
	Non-detect                      None                      UJ                      R			

Note: Since the only one surrogate is outside of evaluation criteria, no qualification of data is required.

### 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA2-MW-10S and SA2-MW-4-D were spiked and analyzed for SVOCs. Various analytes were outside of evaluation criteria for both samples due to high levels in parent sample. No qualification of data required.

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: 1,4-Dichlorobenzene (93) and Hexachloroethane (90) had LCS recoveries outside of evaluation criteria (40-92) and (35-89), respectively. All associated data was nondetect; therefore, no qualification of data was necessary.

## 10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing		x	
	Area > +100%      Area < -50%      Area < -10%			
	Positive      J      J      J			
	Non-detect      None      UJ      R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: The internal standard Perylene-d12 (432655) was outside of evaluation criteria (452773-1811090) for the field blank SA2-MW-7-M-FB. Since this sample was a field blank, no qualification of data was required.

## 11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note:

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

### Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	<input checked="" type="checkbox"/>		
13.2	Were all RPD or absolute difference values within the control limits?	<input checked="" type="checkbox"/>		
	No action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Sample SA2-MW-6-M-Dup was the duplicate of SA2-MW-6-M. All RPDs were within evaluation criteria.

### 14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	<input checked="" type="checkbox"/>		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			
	% Completeness			

Note:



# DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer: Steve Gragert  
Date: 8/25/2006  
Laboratory: Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2  
Project Number: 21561683.80011  
SDG No.: SAS049  
Review Level: Level III

## Major Anomalies:

No samples were rejected.

## Minor Anomalies:

No other qualifications of data were required.

Field IDs: SA2-MW-6-M SA2-MW-6M-DUP SA2-MW-6-D  
SA2-MW-9-D SA2-MW-9-D-D SA2-MW-9-M  
SA2-MW-7-D SA2-MW-5-D SA2-MW-5-S  
SA2-MW-5-M SA2-MW-7-M-FB SA2-MW-7-M

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated the grand mean exception was applied to the continuing calibration verification standards. The rule is described in method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference of all the compounds in the CCV is less than or equal to 15%. Also, Dichloroprop recovery was outside of evaluation criteria in the LCS. These issues will be discussed in the appropriate sections below.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ( $> 10^{\circ}\text{C}$ ), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All holding times were met.

### Blanks (Method Blanks and Field Blanks)

(Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All method blanks and the field blank (SA2-MW-7-M-FB) met criteria.

### 4.0 Initial Calibration (Code r)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument	x		
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note: Initial calibration was met.

### 5.0 Continuing Calibration (Code c)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 12 hours?	x		
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?	x		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from ave CF to verify correct calculations.			x

Note: The grand mean exception was applied to the continuing calibration verification standards. The rule is described in method SW-846 and states that when one or more compounds fails to meet acceptance criteria, the initial calibration may be used for quantitation if the average percent difference of all the compounds in the CCV is less than or equal to 15%. The CCV was within evaluation criteria by applying the grand mean, no qualification of data was required.

### 6.0 Surrogate Recovery (Code s)

		Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R			

Note: All samples had acceptable surrogate recoveries

**Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)**

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD analyzed with this batch was not part of this SDG. No qualifications required.

**8.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)**

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: Dichloroprop had a recovery (122%) outside of evaluation criteria. (43-106%). All associated data were nondetect; therefore, no qualification of data was required.

**9.0 TCL Identification (Code w)**

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		

Note:

**10.0 TCL Quantitation and Reported Detection limits (Code p)**

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?	x		
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: Samples did not require dilutions.

**11.0 Field Duplicate Samples (Code f)**

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Sample SA2-MW-6M-DUP was a duplicate of SA2-MW-6M. All analytes in both samples were nondetect. No qualification of data were required.

**12.0 Data Completeness**

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample,	x		
12.2	Number of samples:		x	
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness		100	

Note:

**DATA VALIDATION WORKSHEET - Level III Review**  
**Inorganic - ICP, ICP-MS, GFAA, and CVAA**

**Reviewer:** Steve Gragert  
**Date:** 8/25/2006  
**Laboratory:** Severn Trent Laboratory - Savannah

**Project Name:** Sauget - Area 2  
**Project Number:** 21561683.80011  
**SDG No.:** SAS049  
**Review Level:** Level III

**Major Anomalies:**

No samples were rejected

**Minor Anomalies:**

Samples required qualification due to sample results less than 5X the blank result.

**Field IDs:**

SA2-MW-7-D	SA2-MW-7-M-FB	SA2-MW-9-D
SA2-MW-6-M-D	SA2-MW-6-M	SA2-MW-5-D
SA2-MW-7-M	SA2-MW-6-M-Dup	SA2-MW-5-S
SA2-MW-9-D-D	SA2-MW-9-S	SA2-MW-5-M

**1.0 Chain of Custody/Sample Condition/Raw Data**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x										x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C ± 2 °C)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x		

Note: The laboratory case narrative indicated that MS/MSD sample, SA2-MW-6-D, had potassium, calcium, iron, and magnesium recoveries outside of evaluation criteria. No other issues were noted in the laboratory case narrative.

**2.0 Holding Time (Code h)**

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table. Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).		x			x			x			x	

Note: All samples met holding time criteria.

### 3.0 Instrument Calibration (Code c)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	x									x		
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	x									x		
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	x									x		
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%). Action: R(+/-) J(+)/UJ(-) J(+) R(+) Mercury < 65% 65% - 79% 121% - 135% > 135% Other Metals < 75% 75% - 89% 111% - 125% > 125%	x									x		

Note: Instrument calibration for CVAA was not listed as correlation coefficients, it was listed as %R and all %Rs were within evaluation criteria.

### 4.0 Blanks (Code o - Calibration blank failure, Code p - Preparation blank failure, Code x - Field blank failure)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	x									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.	x										x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: The analyte aluminum (-0.0331 mg/L) results that were less than 5 times the continuing calibration blank values and were qualified "U."

Field ID	Analyte(s)	Qualification	Code	Run #	Justification
SA2-MW-6-D	Aluminum	U	o	680-18316	<5X CCB contamination
SA2-MW-9-D	Aluminum	U	o	680-18316	<5X CCB contamination
SA2-MW-9-D-D	Aluminum	U	o	680-18316	<5X CCB contamination
SA2-MW-5-D	Aluminum	U	o	680-18316	<5X CCB contamination

### 5.0 ICP Interference Check Sample (ICS) (Code n)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	x											
5.2	Are the ICS AB recoveries within 80% - 120%?	x											
5.3	Are the results for unspiked analytes (in ICS A) < +IDL?	x											
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?												
Action:													
Not Spiked Analytes													
Spiked analytes (ICS AB analytes)													
< -IDL > IDL													
< 50% 50% - 79% > 120%													
UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)													

Note:

### 6.0 Laboratory Control Sample (LCS) (Code l - Recovery, Code e - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x									x	
Action:													
Solid													
< LCL > UCL													
< 50% 50% - 79% > 120%													
J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)													

Note: All recoveries met evaluation criteria.

### 7.0 Laboratory Duplicates (Code k)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	x									x		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		x									x	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x									x

Note: The laboratory duplicated SA2-MW-6-D and SA2-MW-6-M for both ICP and CVAA. All RPDs were within evaluation criteria.

## 8.0 Spike Sample Analysis -Pre-Digestion (Code m - Recovery, Code d - RPD)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	X									X		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet. Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.		X									X	
8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)  <div> <div>%R &gt; 125%</div> <div>30% &lt; %R &lt; 74%</div> <div>%R &lt; 30%</div> </div> <div> <div>Positive J</div> <div>Non-detect None</div> </div> <div> <div>J</div> <div>UJ</div> </div> <div> <div>J</div> <div>R</div> </div>	X									X		

Note: Samples SA2-MW-6-D and SA2-MW-6-M were spiked and analyzed for ICP and Mercury analysis. Potassium (128%) was recovered outside of evaluation criteria (75-125%) for SA2-MW-6-D. The LCS data was within evaluation criteria; therefore, no qualification of data was required.

## 9.0 Instrument Detection Limits (IDL)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?	X									X		

Note:

## 10.0 ICP Serial Dilutions (Code s)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	X											
10.2	Was a five-fold dilution performed?	X											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	X											

Note: Sample SA2-MW-6-D and SA2-MW-6-M were diluted and analyzed. All %Ds were within evaluation criteria.

## 11.0 Field Duplicate Samples (Code f)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	X									X		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 35% or difference < ± 2 x PQL and For solids, RPD < 50% or difference < ± 4 x PQL)	X									X		

Note: Sample SA2-MW-6-M-Dup was the duplicate of the parent sample SA2-MW-6-M. All RPDs were within evaluation criteria.

## 12.0 Result Verification (Code Q)

		ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			X									X
12.2	Were all dilution reflected in the positive results and detection limits?	X											X

Note: The matrix of samples analyzed was aqueous, no samples submitted were solid-matrix.



### 13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPC or use 95% for aqueous sample, 90% for soil sample)						
13.2	Number of samples:	12		0		0	12
13.3	Number of target compounds in each analysis:	22		22		0	1
13.4	Number of results rejected and not reported:	0		0		0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$						
	% Completeness	100		#####		###	100

Note: All data was usable.

# DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer: Steve Gragert  
Date: 8/28/2006  
Laboratory: Severn Trent Laboratory - Savannah  
Test Name: Dissolved Gasses, chloride, ammonia, nitrate/nitrite, sulfate, Total  
Method No.: RSK 175, 325.2, 353.3, 375.4, 415.1, 310.1

Project Name: Sauget - Area 2 Supp. Invest.  
Project Number: 21561683.80011  
SDG No.: SAS049  
Review Level: Level III

## Major Anomalies:

No samples were rejected.

## Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: SA2-MW-6-M SA2-MW-6M-DUP SA2-MW-6-D  
SA2-MW-9-D SA2-MW-9-D-D SA2-MW-9-M  
SA2-MW-7-D SA2-MW-5-D SA2-MW-5-S  
SA2-MW-5-M SA2-MW-7-M-FB SA2-MW-7-M

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition	x		

Note: The laboratory case narrative indicated the methane results exceeded the upper calibration range of the flame ionization detector in 3 samples; therefore, the results were reported from the thermal conductivity detector.

## 2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached	x		
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: All samples were analyzed within holding time criteria.

## 3.0 Blanks (Method Blanks and Field Blanks) (Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?	x		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field blank SA2-MW-7-M-FB had detections of Nitrate (0.036) and Nitrate-Nitrite (0.036). All associated data were nondetect; therefore, no qualification of data was required.

### Initial Calibration (Code c)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
4.2	Are correlation coefficients stable ( $>0.995$ ) over the concentration range of the instrument? If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	x		
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note: All initial calibration were within evaluation criteria.

### 5.0 Continuing Calibration (Code r)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	x		
5.2	Has a continuing calibration standard been analyzed every 10 samples?	x		
5.3	Do any analytes have a %R outside QC limits (80-120%)? If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For %R $< 50\%$ , flag R.		x	
5.4	If Level IV, calculate a sample of %Rs.			x

Note: All continuing calibrations were within evaluation criteria.

### 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix . Recoveries $<10\%$ may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample SA2-MW-6-M was spiked and analyzed. For sample SA2-MW-6-M, Carbon dioxide had an RPD (69,44/44) outside of evaluation criteria (30), Ammonia recoveries (111,111/0) were outside of evaluation criteria (90-110/30). All LCS recoveries were within evaluation criteria; therefore, no qualification was required based on MS/MSD data.

### 7.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R $>$ UCL,			x

Note: All LCS recoveries are within evaluation criteria.

### 8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the	x		

Note:

### Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?	x		
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	x		
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note: The methane results exceeded the upper calibration range of the FID detector in samples SA2-MW-9-M, SA2-MW-5-M, SA2-MW-7-M; therefore, the results were reported from the tCD.

### 10.0 Field Duplicate Samples (Code f)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a			

Note: Sample SA2-MW-6-M-Dup was the field duplicate of SA2-MW-6-M.

### 11.0 Laboratory Duplicates (Code k)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per		x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < + PQL for aqueous, and RPD			x

Note: The laboratory did not duplicate any samples for analysis.

### 12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90%		x	
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			100

Note:

**DATA VALIDATION WORKSHEET**  
**DIOXINS AND FURANS ANALYSIS - NFGs modified for Method 8280A**

**Reviewer:** Steve Gragert  
**Date:** 8/21/2006  
**Laboratory** Severn Trent Laboratory - Sacramento

**Project Name:** Sauget - Area 2  
**Project Number:** 21561391.00001  
**SDG No.:** G6G070273  
**Review Level:** Level III

**Major Anomalies:**

No samples were rejected in this SDG

**Minor Anomalies:**

No samples were qualified in this SDG

**Field IDs:** SA2-MW-4M  
SA2-MW-4S  
SA2-MW-4D

**1.0 Chain of Custody/Sample Condition**

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and laboratory narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		
1.4	Does the sample preservation, collection and storage meet method requirements?	x		
1.5	Are the sample preparation benchsheets present and complete with pH values, sample weights, dilutions, final volumes, percent solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x		
1.6	Are the measurement readout records legible and complete (properly labeled, and include all samples and QC)?	x		

**Note:** The case narrative indicated that a sample container for sample SA2-MW-4S was received in broken. There was sufficient sample available for analysis.

## 2.0 Holding Time/ Preservation - Reason Code: H - holding time violation.

		Yes	No	NA
2.1	Were samples preserved as specified in the method?	x		
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: 30 days of VTSR. Analysis: 45 days after extraction.		x	
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: \_\_\_\_\_

## 3.0 Instrument Calibration - Reason Code: R - Initial Calibration failure and C - Continuing Calibration failure.

		Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? If no, use professional judgment to determine the effect on the data and note in the reviewer narrative.			x
3.2	Was an initial calibration analyzed at the beginning of each analysis? If no, use professional judgment to determine the effect on the data and note in the reviewer narrative.			x
3.3	Was a continuing calibration verification (CCV) analyzed every 12 hours? If no, J(+)/UJ(-) all samples analyzed after the last passing CCV.			x
3.4	Are all initial calibration standard %RSDs within the control limits? %RSD $\leq$ 20% for the 17 target PCDD/PCDF and $\leq$ 30% for the 9 labeled internal standards. Action: J(+)/UJ(-).			x
3.5	Are all continuing calibration standard %Ds within the control limits? %Ds $\leq$ 15%			x
3.6	Is the instrument sensitivity (S/N ratio) greater than 10? One each selected ion current profile (SICP) and for each GC signal corresponding to the elution of a target analyte and its labeled standard, the S/N must be $> 2.5$			x
3.7	Were any transcription/calculation errors noted in the calibration verification data? Action: For any transcription or calculation errors, contact the laboratory for explanation/resubmittal.			x

Note: \_\_\_\_\_

## 4.0 Blanks (Laboratory and Field) - Z - Method Blank contamination and X - Field Blank contamination

		Yes	No	NA
4.1	Were preparation blanks (PBs) prepared at the required frequency (one per 20 samples, per batch, per matrix and per level)?	x		
4.2	Do any preparation/instrument/reagent blanks have positive results? Action: If yes, action level of 5		x	
4.3	Were any transcription/calculation errors in blank data?		x	
4.4	Do any field equipment blanks and trip blanks have positive results?			x
4.5	Are there field equipment/trip blanks associated with every sample?		x	

Note: No field or trip blanks were associated with this SDG.

### 5.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Reason Code: M - MS/MSD Recovery Failure

		Yes	No	NA
5.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
5.2	Were matrix spikes analyzed at the required frequency (one per 20 samples per batch) for each matrix?	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
5.3	Was a field blank used for MS/MSD analysis?		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5.4	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits? See tables 6I, 6J and 6N in the project QAPP.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5.5	Are there any RPDs for matrix spike and matrix spike duplicate recoveries outside the laboratory QC limits? See tables 6I, 6J and 6N in the project QAPP.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5.6	Were there any transcription/calculation errors?		<input checked="" type="checkbox"/>	

Note:

### 6.0 Laboratory Control Sample (LCS/LCSD) - Reason Code: L - LCS Recovery Failure

		Yes	No	NA
6.1	Is an LCS/LCSD recovery form present?	<input checked="" type="checkbox"/>		
6.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	<input checked="" type="checkbox"/>		
6.3	Are there any %R for LCS/LCSD recoveries outside the laboratory QC limits? See tables 6I, 6J, and 6N in the project QAPP. Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; for %R < LCL, J(+)/UJ(-); for any %R <30%, J(+)/R(-).		<input checked="" type="checkbox"/>	
6.4	Are there any RPD for LCS/LCSD recoveries outside the laboratory QC limits? See tables 6I, 6J, and 6N in the project QAPP. Action: J(+) only.		<input checked="" type="checkbox"/>	
6.5	Were there any transcription/calculation errors?		<input checked="" type="checkbox"/>	

Note:

### 7.0 Field Duplicate Samples Reason Code: F - Field Duplicate Imprecision

		Yes	No	NA
7.1	Were field duplicates collected and analyzed at the required frequency (one per 20 samples, per matrix, per level)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
7.2	Are all analyte duplicate results within control limits? If no, J(+)/UJ(-) or professional judgment.	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
	For sample results > 5 x CRDL (or the RL), a control limit of 50% RPD for aqueous samples and 100% RPD for soil samples will be used. For soil/aqueous sample results, 5 x CRDL (or RL), a control limit of 2 x CRDL (or RL) will be used.			
7.3	Were there any transcription/calculation errors noted in the duplicate data?		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Note: No field duplicates were collected / analyzed for this SDG.

## 8.0 Sample Results/Detection Limit Verification Q - Other

		Yes	No	NA
8.1	Are all sample results within the calibration range?	x		
8.2	If samples are not within the calibration range, were they diluted and re-analyzed or was a high-level check standard analyzed? If not, contact the laboratory. Request re-analysis if holding times have not been exceeded. If exceeded, qualify specific sample(s) J.			x
8.3	Do detection limits meet those required by the project QAPP and were properly adjusted for dilution factors and moisture?	x		
8.4	Were there any transcription/calculation errors?		x	

Note: All samples were non-detect for all analytes. No dilution was required.

## 9.0 Internal Standards, Surrogate and Clean-up Recovery I - Internal Standard Failure and S - Surrogate Failure

		Yes	No	NA
9.1	Are all samples listed on the appropriate Standard Recovery Summary Form?	x		
9.2	Are standard recoveries within acceptance criteria for all samples and method blanks?	x		
9.3	If no, were the sample(s) or method blanks re-analyzed?			x
9.4	If samples were not re-analyzed, is any sample dilution factor greater than 10? (surrogate recoveries may be diluted out.)			x
9.5	Were there any transcription/calculation errors?		x	

Note:

## 10.0 Data Completeness

		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	x		
10.2	Number of samples:			
10.3	Number of target compounds in each analysis:			
10.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((10.1 \times 10.2) - 10.3) / (10.1 \times 10.2)$			
	% Completeness			
		3	19	0
				100

Note: